

GROUP TESTS

130 Easy PCs

Not everyone is undaunted by the morass of wires and boxes you find after unpacking your new PC. This group test spares a thought for the novice user, challenging manufacturers to supply a £999 PC with ease-of-assembly in mind



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Cinema, the last bastion of analog, will soon **turn to the dark digital side** – may the force be with it.

Wave goodbye



As the worlds of consumer goods and IT grow ever closer, it looks like the analog signal could soon be a thing of the past. Finding a home with a vinyl record deck these days is as likely as finding the proverbial needle in a haystack.

The convenience and superior quality that the digital medium of Compact Disc offered soon killed off vinyl. The fact that Compact Disc in a non-contact digital medium means that it will sound just as good the hundredth time you play it as it did the first time. The problem with analog contact mediums is that they degrade with each play.

Following the trend, it looks like MiniDisc is sure to replace the compact cassette. MiniDisc decks are now affordable and the blank discs are cheaper than a decent cassette. Again, MiniDisc offers the same benefits as CD, as well as being considerably smaller than a cassette.

Now we're starting to see the end of VHS video cassettes as well with the introduction of DVD. It's safe to say that DVD is finally starting to take off in the UK, with a decent amount of Region 2 software now available. Of course, the argument against DVD replacing VHS is its lack of a record feature, but this shouldn't be an issue for too long. Pioneer has already got a working prototype of a consumer DVD recorder. Once the copy protection issues are sorted, there's no reason why we won't be recording *Eastenders* on small silver discs rather than bulky VHS cassettes.

Even the humble television has succumbed to the ever-advancing digital avalanche. Thanks to ON-Digital, you can behold the beauty of digitally transmitted television programmes by placing a free box under your TV.

Add to this digital phones, cameras and camcorders, and there's very little left that hasn't been eclipsed by its digital counterpart.

Of course, there will always be arguments in favour of traditional analog technology, and many advocates will still insist that the quality is better. In some respects it is. Digital photography, for example, offers nowhere near the resolution of chemically processed film. However, it is good enough for most consumer camera users to be

happy with the results, and with more photo printers hitting the market you don't even need a PC to get your pictures off the camera.

But even with all this digital wizardry there's still one area where the analog format remains king: the cinema. It's amazing that movies are still recorded and transported on large reels of film that are subject to damage and degradation. That is until now. At the recent Comdex show in Las Vegas, Sony unveiled its new digital video camera that's destined to change the way movies are made forever. Bold claims are heard all the time at press conferences, but this claim had some heavyweight backup in the form of George Lucas. Mr Lucas proclaimed his support for Sony's new baby and by now should have taken delivery of several units for the filming of *Star Wars Episode II*. Lucas has long said that he wants to shoot *Episode II* digitally and Sony has come up with the means to do so.

With the raw footage shot digitally, editing the movie will be a far simpler process, as well as being a great deal more cost-effective. Unfortunately the digital footage

The cost of film distribution could be A THING OF THE PAST. There's no reason why movies couldn't be transmitted to a cinema via satellite

still has to be transferred to 35mm film for distribution and viewing in cinemas, which is costly and time-consuming. But even this obstacle should be overcome in the not-too-distant future. Lucas has already experimented with digital projecting, showing *Episode I* at selected cinemas in the US using a digital print and corresponding projector. When this type of projection method becomes commonplace, the high cost of film distribution could be consigned to history. There's no reason why movies couldn't be transmitted to a cinema via satellite, assuming that there's enough encryption embedded in it to stop pirates grabbing it from the ether.

There are now few areas of our lives where digital technology hasn't been implemented, bringing with it improvements in speed, clarity, convenience and security. With benefits such as these it's fairly safe to say that the analog waveform has had its day.

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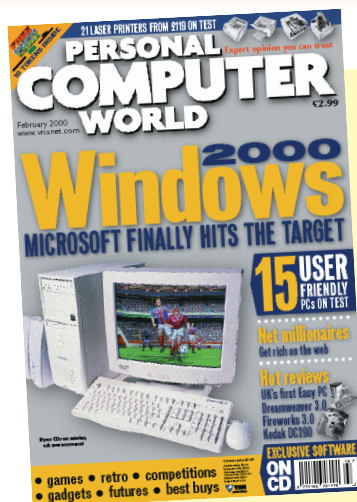
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141,746
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WELCOME TO THE FEBRUARY 2000 PERSONAL COMPUTER WORLD CD-ROM

February COVER DISC

GAMES

APPLICATIONS

LIBRARY

ENTERTAINMENT

INTERNET

Stressed? Feeling under the weather? Sort your health out with Dr Schueler's Medical Adviser and organise your life with the full version of the Sidekick personal organiser. Oh, and Lara needs a hand sorting out humanity – try out our Tomb Raider demo.

Dr Schueler's Medical Adviser

Have you ever needed the answer to a medical question and not been able to consult a doctor? Or are you just fascinated by health and the human body? Dr Schueler's Medical Adviser on this month's cover disc could be the answer.

Health Perfect's package works both as a reference source for medications, nutrition and diseases, as well as a self-diagnostic program which, while not attempting to supplant a doctor's assessment, can help you come to your own conclusions through straightforward question and answer sessions.

Dr Schueler is on call 24 hours a day in the comfort of your own home, offering expert medical advice and guidance whenever you need it. The package can advise you on the causes and prevention of illness; help you detect and diagnose potential problems at an early stage; warn you when urgent professional attention may be needed; and reassure you with



the advice you need until professional help is available.

Dr Schueler's offers information and advice on:

Symptoms

Question and answer sessions help you analyse your symptoms, and there are thousands of colour images to illustrate the text.

Injuries

Learn how to handle any injury, from burns and ankle sprains to stab wounds and animal bites.

Poisons

You can find out what steps to take if poisoned by any of over 500 household substances.

Health and diet

There is extensive information on vitamins, minerals, nutrition, safety and first aid, lifestyle

health risks, vaccinations, weight loss, special diets and travel advice.

Medications

Explore a mass of information on over 4,000 prescription and non-prescription drugs. Find out when and why they are used, their side effects and interactions, and any precautions you need to take.

Diseases

There is up-to-date information on the causes, symptoms, evaluation, treatment and prognosis of over 600 diseases, as well as special sections devoted to women's and children's health problems.

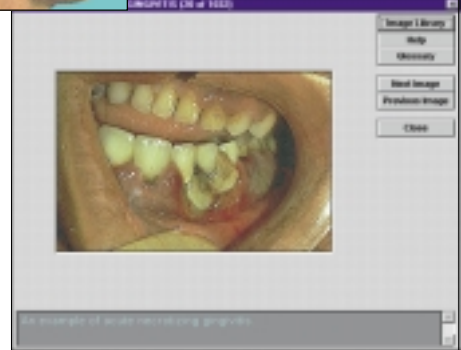
Medical tests

The most frequent medical tests are described and Dr Schueler's will tell you how and when they are performed and why they are necessary, as well as their known risks and complications.

Dr Schueler's Medical Adviser is an invaluable medical encyclopaedia for every home.

Upgrade offer

Once you've tried out the first version of Dr Schueler's Medical Adviser on the disc, why not upgrade to version 2.0 for only



£25? (See opposite page.)

The new version includes over 1,500 full colour images and over 90 minutes of video clips.

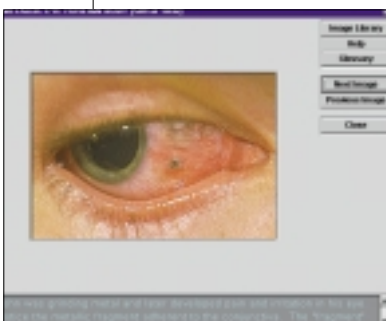
PCW DETAILS

Platform Windows 3.11/95/98

Limitations Interactions are disabled

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Sidekick

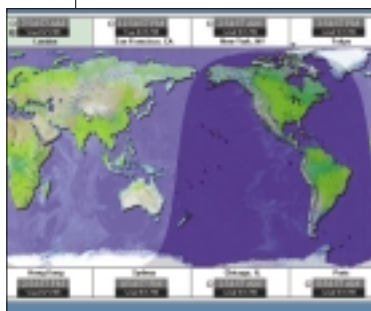
FULL VERSION

Get organised

Organise your social and business lives with the full version of this brilliant and versatile program. As computer programs have become increasingly specialised, Sidekick stands out as a bit of a rarity – a good all-rounder. Under the hood you will find not only a calendar, scheduler and to-do program, but also a word processor, card-index style database, world clock and expenses checker. The program is suitable for home or business use and is particularly useful if you have a Windows CE machine, a Palm Pilot or a REX handheld computer, since it includes built-in features that allow you to synchronise them with a computer.

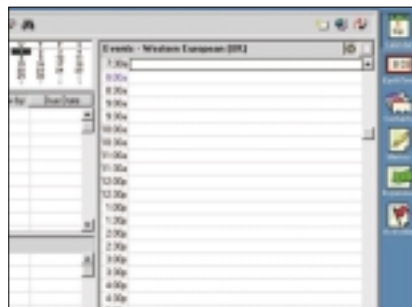
1 Following the instructions that came with the CD-ROM, to install Sidekick 98. There are a few points to note here. First, if you don't want to enter a company name, just type a full-stop. Second, don't install Truesync unless you have one of the handheld computers mentioned above. Third, always look at the Read Me file in case it has any information that's relevant to your particular setup.

When you first start Sidekick, it'll load the Setup Wizard. Follow the dialog boxes



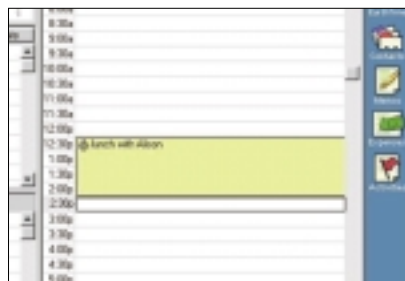
through, choosing your country and city locations but when it comes to the email bit, choose the third option, Do Not Set Up Messaging System Now. You can do this after the program has been installed, but for this project none of the Internet-based features are used. If you accept the defaults, the first screen you see should be the one shown above, EarthTime.

2 Look at the right-hand side of the screen and you'll see Sidekick's main features



depicted as icons. In turn, they're the Calendar for appointments, to-dos, for remembering special events and so on, the world clock EarthTime, Contacts for storing names and addresses. Memos is the word processor, Expenses is as you'd expect and Activities is a summary view of all upcoming events, appointments and to-dos. Click on the Calendar icon at the top.

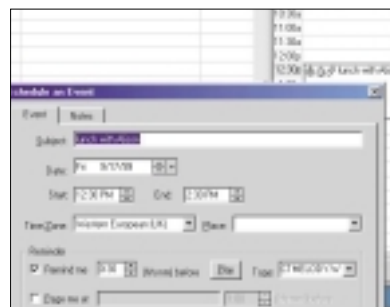
3 Along the bottom are four tabs marked Daily, Weekly, Monthly and Yearly. These are your different Calendar views and the one highlighted in bold is the current view. Assuming you haven't changed any of the defaults, you'll see that the Daily view is split into sections: To Do, Calls and Events. Click on the empty space to the right of 12.30pm in the Events section and type in 'Lunch with Alison'. Next, move the cursor to the bottom line of the outlined box and you'll see it turn into a vertical line with arrows top and bottom. Hold down the left



mouse button and drag the line down to the end of the 2pm slot and let go. Now you've got a decent leisurely lunch. Click anywhere outside the box.

4 Having set an appointment such as this, you can, of course, edit it. You can change its start and end times by clicking on the clock icon and dragging the box up and down the Event list, or by re-sizing the appointment box if you want to shorten or lengthen the appointment.

You might also want to add some extras to an appointment. Click on it once with the right mouse button and from the pop-up menu choose Edit Single



Day Event. In this dialog box put a tick next to the Remind Me option and then choose a sound file from the dropdown list to get an audible reminder of your upcoming appointment. Click on the Notes tab at the top of the box to type in directions, or any background stuff you need to read before leaving and click OK to close.

Your appointment now has bell and paperclip icons

indicating there's an alarm and a note attached to it.

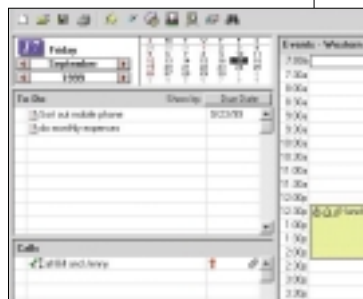
5 Sidekick is clever enough to handle overlapping appointments too, so if you have got an optional meeting that's due to start at

1.30pm – should you finish lunch early – you can see them side by side. Click on the 3pm



slot and enter the appointment as you did in Step 3. Then, click on the clock icon in your new appointments and, holding down the left mouse button, drag it up to the 1.30pm slot and let go. The lunch and meeting times sit side by side.

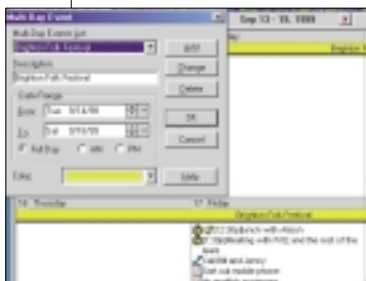
6 Now add a to-do. Click on the first line in the To Do section and type 'Sort out mobile phone'. Then, double-click on the empty column to the right, headed Due Date. In the dialog box you can prioritise this to-do, add notes to it, assign it a category (you may want to run a single calendar with business and personal stuff in it, for example)



and give it a due date when the task should be completed. Fill in the options you want and then click on OK to close the box.

Do the same in the Calls section below. Type in 'Call Bill and Jenny' and double-click in the right-hand column to open the settings box where you can mark a call as urgent – hence the red exclamation mark – add a note and so on. You can mark both to-dos and calls as recurring, entering regular jobs just the once and having them recur at specified intervals.

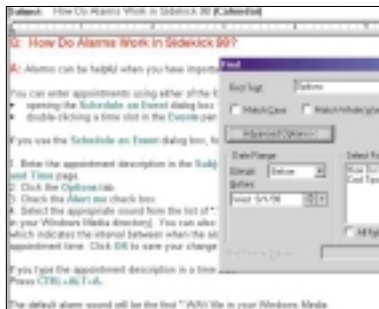
7 Sidekick can also handle multi-day events, which are day-long appointments, such as conferences, festivals, and exhibitions, that span a number of days. Click on the Weekly tab at the bottom of the screen and then, from the Calendar menu, choose Multi-Day Event. When the dialog box appears, type in a name in the Description box and then, using the Date Range commands underneath, give the



event a start and finish date. You can also specify here whether

the event will last the entire day or not. Make the appointment stand out by giving it a bright colour, then click OK to close the box.

8 Now look at the Memos feature. Click on the Memo icon on the right of the screen. You can load memos by choosing Open Memo File from



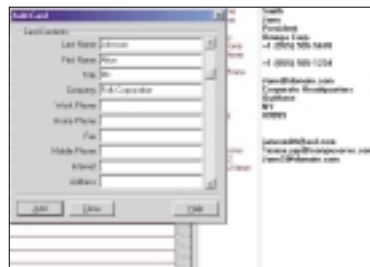
the File menu and then selecting Sidekick 98 Tips from the dialog box. Click OK. On the left now, you can see a list of all of the tips. Try clicking on a few and you'll see the right-hand pane displays the full text of what's in any particular memo slightly offset to the right. To get a full-screen view of the page, click on the icon towards the top right that looks like a square of paper with arrows pointing outwards.

The button bar resembles a word processor and lets you format the text, find specific words, spell-

check, do word counts, print and so on. To move to another memo, click the arrowed icon again. To add a new memo, click the New button on the top left.

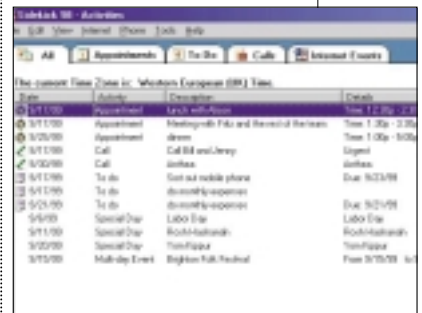
9 Click on the Contacts icon next. You'll notice that the screen is similar to Memos, with the individual cards on the left and their contents in the right-hand pane. In both Memos and Contacts you can have more than one folder open at once. Choose Open Cardfile from the File menu and then load in Business 98. The Special Offers 98 collection of cards is still open and available for you to use at the bottom of the screen.

Switch between the two by clicking on their tabs, edit individual card entries just like Memos – the same icon opens a card to the full-screen width, while the icon to the left creates a new card. Click the New icon to create a new cardfile and follow the dialogs to create your



own field names such as Name, Address and Phone number

10 Of the two remaining features, Expenses works in a similar way to Cardfile, but there is a useful Activities view. Click on the icon and you'll see a list of tabs which let you view all your upcoming appointments, calls and to-dos, either collectively by clicking the All tab, or individually by clicking the relevant category tab. To the right you'll see a dropdown box



entitled Show where you can specify a date range to display. The screenshot above shows all the appointments, calls and to-dos for a single month.

PCW DETAILS

Platform

Windows 95/NT/4.0 or above

Limitations

None

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Technical support

Not available

Tomb Raider: The Last Revelation

Our legendary heroine is back again, for the fourth time and her adventures just keep on getting better! Join Lara Croft in Egypt as she confronts the evil secrets of a Lost Tomb.

This episode of Lara's adventures is subtitled 'The

Last Revelation' and its plot revolves around ancient Egyptian mythology and the alignment of the stars at the millennium. While Lara Croft is exploring Egypt she discovers a lost tomb and foolishly unleashes the ancient evil. In a race against time Lara must use all her wit to re-imprison the evil and rectify a situation that threatens to destroy humanity.

None of the releases of Tomb Raider have shied away from pushing gameplay technology to the limit and The

Last Revelation is no exception. New programming routines alter the whole feel of the game and deliver a familiar theme as a completely fresh experience. Most notable is the elimination of loading screens so that now the adventure becomes one continuous experience.

The demo on our cover disc gives you a taster, but the full game is now available.

With Lara's popularity this game can't fail to appeal, but The Last Revelation comes up to all expectations.



PCW DETAILS

Platform

Windows 95/98

Limitations

Function-limited

Sales contact

www.eidos.co.uk

FreeBee



FreeBee combines the searching power of the most popular web-based

search engines into one fast, easy-to-use tool.

This is a global, automated search program that quickly gathers Internet results from the most popular web-based search engines to deliver comprehensive answers to your search requests – fast. It effectively combines five products into one:

- Find Information on the web
- Read the latest news
- Locate email addresses
- Download the latest software
- Keep track of articles posted in newsgroups!

FreeBee is extremely easy to use, with an intuitive interface so that you can start searching right away.

The program understands non-technical, plain English requests and will query more than 40 of the most popular search engines and return only



the most accurate results.

Any duplicate results and dead links are automatically eliminated to reduce some of the frustration of searching the Internet.

The results are combined into one list and ranked in order

of relevance. Summary information for each result is available by simply moving the mouse pointer over it.

You can use FreeBee not only in English, but also in Spanish, Italian, French or German. You can easily switch between these languages to suit your particular preferences.

PCW DETAILS

Platform

Windows 95/98/NT4/2000

Limitations Function-limited (limited number of simultaneous search engines)

Sales contact

sales@transerve.com

Technical support

support@transerve.com



Personal Computer World is putting education first in a special offer. Start collecting tokens and you can get the best software for your kids!



THE TIMES

THE SUNDAY TIMES

We're teaming up with Times Newspapers and Time Computers to offer £35m worth of educational software free for schools and homes.

What to do

This is your last chance to collect tokens from PCW. In this issue we're giving away 'For School' tokens that schools can collect to get much-needed software from a list of more than 120 titles. On top of this, we will be giving away 'For Home' tokens that you can collect to claim one of 29 titles for your home. Simply cut out and collect.

For School tokens:

Pass on your For School tokens to your child's school. Or, if you don't have kids, give the tokens to neighbours to claim software. And they will be able to collect an unlimited number of tokens to claim software.

For Home tokens:

Keep your For Home tokens so that you can claim your own free software (one title per household) by visiting a Time Computer store to collect your chosen titles. Call 0800 316 2317 to find out where your nearest Time store is.

Bonus tokens:

Tokens are also being given away in our sister publications *Computeractive* and *What PC?*. You can also collect tokens every day from *The Times* and *The Sunday Times*. And you can get 1,000 tokens or more when you buy a Time computer. Plus you can claim an extra title yourself from the list of Home Software titles when you register with Netline free Internet service via www.softwareforschools.co.uk.

A medley of titles:

If you collect enough home tokens you can choose from a selection of software titles including:
 Art Attack – Creativity, Bodyworks 6, Compton's 3D World Atlas, Eyewitness Children's Encyclopedia, GCSE English, French, German, Maths and Science, Get Ready for School, History of the World 2.0, IBM Worldbook Encyclopedia Deluxe, Key Stage 1 Year 1 or 2 Reader Rabbit, Kids Language Lessons French, German and Spanish, Oxford Interactive Encyclopedia, Power Publisher – DTP, Compton's Reference Collection,

Offer ends on 31 January 2000. All tokens must be redeemed by the end of March 2000. Only UK readers and UK schools can claim free software. Promoters Time Computers and Times Newspapers.

<p>5 tokens for home</p>	<p>5 tokens for school</p>
<p>THE TIMES THE SUNDAY TIMES</p>	<p>THE TIMES THE SUNDAY TIMES</p>

Win98 SP1



Windows 98 Service Pack 1 resolves known customer issues with Microsoft's operating system and refreshes Windows 98 for owners of the original version. Some of the fixes include:

- Windows 98 System Update** Security fixes and hardware-specific updates
- IE4.01 with Service Pack 2** Internet-related updates and security fixes
- Outlook Express Update** for version 4.72.3612.1713
- Windows 98 Y2K Update** Corrects date generation and leap year calculations
- Windows 98 Y2K Update 2** Corrects additional minor Y2K issues

PCW DETAILS

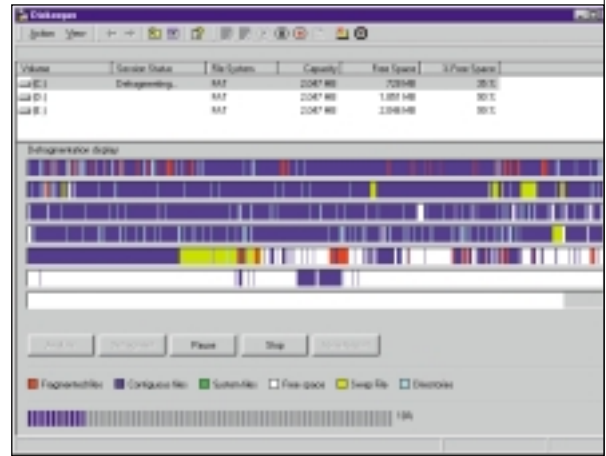
Platform
Windows 98
Limitations None

Diskeeper 5.0

Diskeeper is the first automatic disk defragmenter for Windows 95*/98/NT that has been developed. It provides complete administrative functionality and control over the Windows NT network for both servers and workstations.

It significantly restores system performance lost to fragmentation – something noticed particularly in the load times of heavily used applications, which is a major user concern. It consolidates and defragments the paging file and directory files, improving performance results.

Diskeeper is easy to deploy across a network and manage remotely, and it can operate across a network with full



administrative functionality.

The NT version of Diskeeper 5.0 introduces Frag Guard, a feature that permits automatic defragmentation

scheduling of the Master File Table (MFT) and paging file at boot-time, when needed. Frag Guard also has an online feature to ensure that MFT and paging file frag-

mentation is at a minimum. * Please note that Diskeeper 5.0 will only run on Windows 95 OSR2 or above.

PCW DETAILS

Platform
Windows 95*/98/NT
(* For Windows 95 OSR2+ only)
Limitations 30-day time-limited demo
Sales contact
01342 327477 www.execsoft.co.uk
Technical support
(UK only) 01342 327477
8.30am to 5pm



Technical information to help you use the CD

- ✓ **How to use the CD-ROM**
Put the disc into your CD drive:
Windows 9x If you've got Windows 9x, the PCW interactive loader will appear on your screen. If your CD doesn't autoload, go to Start/Run and type in <CD Drive>:\pcw.exe
Windows 3.1 From Windows Program Manager, choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.
- ✓ **System requirements**
You will need a PC running Windows 3.1 or Windows 9x. The disc will run under Windows NT but functionality may be reduced. Please check individual products for specific system requirements. For best results, run the CD on a Pentium PC with at least 16MB of memory running in 16bit colour depth (thousands of colours).
- ✓ **Faulty discs**
If your drive continually scans

the disc without starting, or displays read errors, you may have a faulty disc. In this event, please return the disc with a covering note, detailing your name and address, and clearly marked 'PCW CD FEBRUARY 2000, to:
TIB plc
HelpLine Returns
Unit 5 Triangle Business Park
Pentrebach
Merthyr Tydfil
Mid Glamorgan CF48 4YB
quoting reference
'PCW Vol 23 No 2'.

A replacement disc will be sent to you by post. NOTE: Replacement discs cannot be supplied direct from the VNU offices.

- ✓ **Technical support**
If you have technical problems with individual products, please check in the magazine or on the CD for the manufacturer's support contact details. For

general problems with the CD, the Technical Helpline is open weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm on **01685 354726**.

A live technical info page is also available through CDOnline direct from the CD. Please see 'Faulty discs' for replacement disc information.

- ✓ **Getting software on to the CD**
Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc. For cover-mount enquiries please telephone **Jonathan Hardy** on 020 8316 9851 or email jonathan_hardy@vnu.co.uk

IMPORTANT NOTICE

These products are for personal use only, on one PC at a time. You may not rent, lease, assign, re-sell or otherwise transfer the rights to anyone for any product contained on this CD, or use any product for public performance. Neither the suppliers nor the publisher shall accept responsibility for any losses or damage resulting from use of this software, including any loss of profit, damage to equipment, interruption of business or data or any other damage either direct or accidental. It is recommended that you back up any programs and data on your hard disk before installing any software. Please read the installation and system requirement instructions carefully before using.

The publisher, VNU, has checked the Personal Computer World CD-ROM for known viruses at all stages of production, but cannot accept liability for damage caused either to your data or your computer system, which may occur while using either the disc or any software contained on it. If you do not agree with these conditions, you should not use the disc.

It is good practice to run a virus checker on any new software before running it on your computer, and also to make regular backup copies of all your important data.

Unless otherwise stated, all of the software contained on the CD is for demonstration only. This means it may be restricted in some way: for example, it may be time limited or have certain functions disabled.

Miscellennium news >>

Clive Akass gives a personal view of IT at the cusp of the millennium

The millennium revolution

The millennium has been associated with apocalyptic change since John of Patmos wrote the *Book of Revelations* some 1,900 years ago. But for millennia, change happened very slowly, as human discovery followed a classic exponential curve. The simple stone tools of our precursors were much the same for several hundred thousands of years.

Some 50,000 years ago they began to get more refined, clearly made by people very close to us in skill and intelligence. In historic times technology changed fairly steadily until about 300 years ago, when the pace began to quicken. It has been accelerating ever since.

The news pages this month, particularly those about Fall Comdex, present a snapshot of an industry that is pushing the pace faster than ever. No-one is quite sure where it is heading, which makes it all the more exciting.

You can still find people dismissing the Internet as so much hype, but they simply do not understand what is going on. You may argue about how quickly it will happen, and what we may lose and gain, and whether you really want to shop at a virtual Tesco rather than walk to your corner shop. And certainly, the Internet will not be the only medium of interactivity.

People across the world

are connecting in a way they could never do before. Human interaction is changing. Trade is changing. Work and living patterns are changing. This may not be the apocalypse of the prophets, but the world as we know it is passing. Nothing will ever be the same again.



Er, I think the apocalypse may have been hit by the millennium bug

IT prediction of the millennium

Speech and handwriting recognition have reached useful accuracy but will never match the precision of a keyboard. The result is that small devices make poor input devices (see page 30); or put another way: for serious work, computers have to be at least the size of usable keyboards.

This problem will be turned on its head: rather than getting a machine to read our handwriting (which we can hardly do ourselves) we will use a script that can be read unambiguously by machines. It will require fewer symbols because a machine reads *how* they are written: an up stroke is different from a down. It will be read by software hardly more complex than a keyboard interpreter. And it will sprout a shorthand.

This prediction could be wrong. A less efficient system may evolve from near-standard handwriting like the Palm Pilot's Graffiti. Whatever: the human-machine interface is a major bottleneck, and it deserves far more attention than it gets.

Image of the millennia



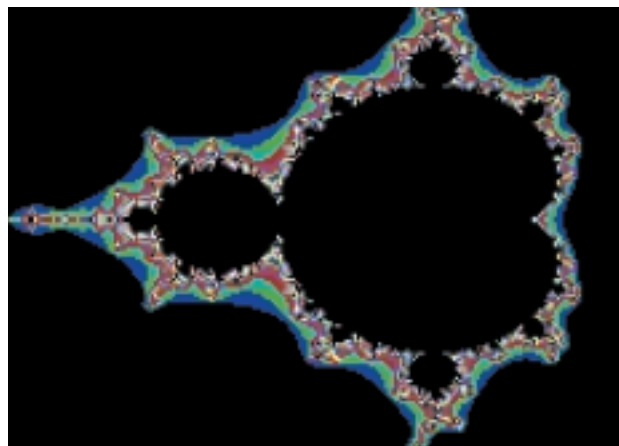
This is a Shiva lingham, which has roots way back into prehistory and can be seen in any number of shrines across India. The channel in its yoni, the circular surround, represents the river of life, springing from the play of dualities: masculine and feminine, being and nothingness, nought and one.

The image has a near literal truth in digital computing: everything that can be expressed is expressed as ones and zeros. Of course 0 and 1, the mother and father of all numbers, have a deep Freudian resonance; which may be why one of the oldest images in the world encompasses so precisely one of the most modern of technologies.

IT icon of the millennium

The image of the Mandelbrot Set was one of the first, and most spectacular, examples of computers showing us what had never been seen before. Discovered by Benoit Mandelbrot, who invented the word fractal, it is generated by iteration – when you loop a calculation by using one result as the input for the next. Iteration is an

old idea but only with computers could enough calculations be made for it to be useful. More important than pretty pictures was the discovery of the complexity that can arise from simple mathematical processes. Iteration models many natural processes, and has helped us understand why life looks like it does.



Bug of the millennium

You are leaving it a bit late if you haven't given your machine a Y2K check by the time this edition hits the newsstands.

Console yourself with the thought that the bug actually kicked in months ago at the start of the financial year and the world is still spinning round.



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BT responds to criticism with Surftime fixed-fee web access

British Telecom, under pressure to lower the cost and raise the speed of Internet access, is to offer a fixed-fee unmetered service from next month. It has also made a new cut-rate offer for minimal ADSL access.

BT has been told to open its home lines to competitors by July 2001 (see below), providing an open market in fast ADSL access which is certain to bring prices down.

There are three basic monthly tariffs for the new BT Surftime service: £6.99 for unlimited week-day off peak access, £14.99 all week off peak, and £34.99 any time.

This last price compares with the £35 a month, plus a £150 connection fee BT is charging independent service providers per subscriber for a minimal ADSL service: 500Kbits/sec upstream and 256Kbits/sec down.

Estimated charges in BT's initial ADSL announcements were between £40 and £150 a month per subscriber. The cut in price may be more apparent than real as the contention ratio, the number of people sharing an access channel, is higher under the new offer.

BT Surftime could cause turmoil in the access market

as the new charges apply only to BT lines or those of BT partners. Many free ISPs use rival phone companies and take a cut of line charges.

BT chairman Sir Iain Vallance last month said watchdog Oftel's tight limits on line rental increases had 'left BT with little option but to increase local charges'.

Vallance said the delay of four years after BT's first ADSL trial was due to high costs, the lack of a common standard and robust technology, insufficient demand, and the prospect of rival broadband technologies such as third-generation mobile.

Local loop unbundling

Rival companies will have the right to install equipment in BT exchanges following the 'unbundling of the local loop', announced by Oftel last month.

The local loop – the line between exchange and subscriber – was a slow on-ramp to BT's data highways. ADSL changed that by piggy-backing a fast RF signal onto the voice line. Operators installing equipment at both ends of the loop means the use of a wider range of technologies and devices.

Bill Cockburn, group MD of BT in the UK, said it would strive to meet the 1 July 2001 deadline.

Michael Butler, UK MD of MCI Worldcom, said 'with hard work' it may be possible

to bring the deadline forward. UUnet, a WorldCom company, is starting a test ADSL service in the new year.

Barclay Knapp, chief executive of NTL, said unbundling will be 'devilishly impossible'. NTL is trialling ADSL on its own home lines, which were laid with its cable links. These are often twin lines, meaning companies could offer fast links in both directions. But cable companies are rolling out cable modems in their own areas; unbundling will let them extend coverage to other parts of the country.

Martyn Hart, chairman of the Telecom Managers' Association, said operators could just pick lucrative areas. **CLIVE AKASS AND ANDREW CRAIG**

Speed issue for wireless links

Wireless links could be faster than fixed links if telcos don't get a move-on. Orange has

announced an HSCSD service with data rates comparable with a 56K modem. It got into trouble saying General Packet Radio Services (GPRS) won't be ready next year as planned by several firms, including its parent Mannesmann.

Meanwhile, Ericsson's £480 Psion-designed MC-218 handheld has gone on sale prepared for the wireless world. It has a WAP-enabled browser and can link to the web via an infrared link to an Ericsson phone.



Digital camcorders look set for random-access storage. Sony unveiled its MD Discam DCM-M1 at Comdex. It records 20 minutes of MPEG2 video or 4,500 stills on a new 650MB MD-View MiniDiscs. Hitachi showed a prototype MPEG 2 model packing DVD-RAM. *DCM-M1 picture – page 35.*

Bluetooth technology got a major boost when Microsoft, 3Com, Lucent and Motorola joined a consortium founded by Ericsson, IBM and others. *Bluetooth at Comdex – page 36.*



Where else could you see the president of a company give a keynote set among the pyramids?

The wonderful world of Comdex...

Movement is everything in cheap TV dramas. Never let your characters stay still. If they are to address a meeting, don't let them sit and wait for their moment: have them burst in and command attention. If they have to talk head to head, have them walk as they talk, preferably in some exotic location. This is not real life, after all; this is TV.

So there I was at one of the biggest casinos in Las Vegas, striding past the glamour girls, the hoi polloi at the tinkling slot machines, the huddles of punters around the gaming tables... there I was, trying to keep pace with a man rich enough to buy the lot. Balding, portly Steve Ballmer, sporting a crumpled woollen pullover, looked like a man who had come to mend the boiler; but the billionaire president of Microsoft fielded questions like a pro.

I could hear snatches of his answers as other journalists asked him about the recent court ruling that Microsoft had been anti-competitive. 'We have always believed we have acted in the best interests of consumers ... It's naive to think there has been a shortage of innovation. There's more venture capital going into innovation than ever before ... I just want us to be one of the companies that's allowed to innovate.'

I thrust a microphone at him. 'Mr Ballmer ... what do you say to speculation that Microsoft will be broken up?'

'I think it is very premature to assess this,' he said. 'We

are at the beginning of the legal process. We will remain one company, focussed on consumers' interests.'

It was the real-life, near-contradictory answer of a man thinking on his feet, but there in the brash casino it all seemed surreal. It is like this every year. There is no show quite like Fall Comdex. Cebit, held in



LINUS TORVALDS (LEFT) AND BILL GATES: ONE HAS FANS, THE OTHER HAS CUSTOMERS

Hanover each spring, is bigger but it is just an exhibition. Comdex is a performance.

American presidents, whether of a company or a country, are expected to perform. The Comdex keynote speeches provide the heads of the giant US IT companies with a stage: some play the salesman; some the prophet; some tear their rivals to shreds.

The star is always Bill Gates, though all his talks are sales talks, slick but never inspiring. You need to remind yourself this is the richest man in the world.

Each year there is some pretender to his throne, some challenger to the might of the Microsoft-Intel axis. One year it was Apple and IBM with their PowerPC initiative; another time it was Sun's Scott McNealy and Java; then



Larry Ellison strutted his stuff.

McNealy was at it again this year, devoting half his keynote to anti-Microsoft invective and giving away copies of

his free multi-platform Star office suite, which he hopes will rival Microsoft Office.

Yet McNealy was not the big challenger, or not the only one. Computing is no longer a case of Wintel and the minnows. The PC may still rule the desktop, but the desktop no longer rules computing. Power has shifted to the network – particularly to the Internet – which does not care what manner of machine it talks to.

It has allowed all those pretenders of yesteryear – the Power Macs, Java boxes, network computers – to eat away at the PC's power base. This year the talk was of 'beyond the PC' and Gates devoted some of his keynote to access devices he called web companions (see page 41). The ones he showed ran on Windows CE, and it was a

sign of the times that some considered him optimistic.

Linux is not the only operating system to challenge Windows (see page 24), but it is the most fashionable. One-in-three web servers now use open-source software, and such is the interest in Linux that it had an entire Comdex hall to itself and its guiding light, Linus Torvalds, gave a keynote.

While Gates has customers, Torvalds

has fans. He needs them because they write the code. Microsoft builds by closed process; Linux grows organically by being free to the world: if you can make it better, go ahead. It's parallel processing, nature's way. That's the theory, and it's carried Linux a long way.

Torvalds denies he is out to destroy Windows, but his fans have no such qualms, booing any mention of Microsoft and cheering any hint of its demise.

Comdex has seen it all before – the knockabout comedy-drama, set in one of the most extravagantly over-the-top cities imaginable. Much of the time I hate Las Vegas: its garishness, its vulgarity, its cruel obsession with money. But its buildings are awesome – follies so enormous that, like the mountains beyond them, they seem close enough for a walk. Don't be fooled by their kitsch fantasies of ancient Egypt and Rome: these Caesars' palaces are for real, playgrounds for people who, for better or worse, are shaping our world.

CLIVE AKASS

short stories

EASY IPAQ HOT TO SWAP

Compaq's new-look iPaq eschews ISA and PCI slots and relies on hot-swappable USB



devices for expansion. A basic \$499 (£312) model, without monitor, comes

with a 500MHz Celeron processor, 4.3GB hard disk and 64MB of RAM. A PIII option is also available. IBM and HP have announced similar devices.

www.compaq.com

GETTING AN EYEFUL

Never mind the colour, feel the width... these machines from Biostar should be on sale in PC World stores soon – perhaps by the time you read this.



They are built to AMD's EasyPC reference design, which uses K6-II or K6-III processors. They have five USB ports instead of the usual PC array and boot straight to Windows without going through a BIOS or DOS screen.

CAPABLE CAPSULE

The Qbe 'personal computing tablet' was a finalist in one US magazine's Best of Show listings and boasts: built-in video camera, voice navigation, and a 1,024 x 768 13.3in active matrix touch screen. You can even connect to the Internet while on the move. All for \$3,495 (£2,184). www.qbenet.com



NEW LOOK PCS

Slow death by removing parts

No one believes the PC is about to go away – or if it is, as Sun guru Bill Joy said, it will be a slow death of a thousand cuts. But your new office machine could soon look like the IT equivalent of the Model T Ford.

AMD and Compaq, following Intel's recent lead, offered radically different case designs (see left) with 'legacy-free' architecture, doing away with the old ISA bus, and replacing the mouse, keyboard, joystick, serial and parallel ports with five or more USB ports.

This does away with the mass of wires at the back of machines (for one thing, some USB sockets sit at the front) and looks like a growing trend. There are also motherboard implications: fewer, if any, expansion slots.

There is little sign of the modular Device Bay architecture taking off: most peripherals, instead of slotting into bays, will be daisy chained outside the system box using plug-and-play USB or 1394.

A number of companies showed WebPads and other

devices based around NatSemi's Geode system-on-a-chip. A market for these could be the 'web companions' plugged by Bill Gates. These are designed to plug straight in to Microsoft's MSN web service and provide a business model for ISPs to draw in new customers by giving away or heavily subsidising access boxes.

Among companies making them are Acer and Turkey-based Vestel, which claims to be Europe's number two TV maker – most of its models are rebranded.



Just how cheap the new appliances can get is shown by these neat Vtech email terminals, all based on Geode chips. The one on the right, basically a PDA built round a 56K modem, costs \$79 (about £50) in the US, the one in the centre, with a fixed screen, costs \$110 (£69); and a detachable palmtop organiser provides the screen in the \$149 (£94) model on the left. Vtech has yet to decide whether to sell in the UK. [Vtech 07000 488 324](tel:07000488324)

OPERATING SYSTEMS

Corel lines up with Linux

Corel launched its new distribution of Linux, aimed at making the operating system into a mass-market desktop product. In the short term Linux is more likely to find a home in special-purpose machines such as web servers and access boxes.

NatSemi announced a Linux port to its Geode-driven WebPad (see above) and Boca Research was one of several companies showing thin clients using the OS.

Linux is not the only OS in

the picture. The Be OS has also ported to the WebPad and the developers are co-operating with NatSemi on a series of devices.

Be was launched in the belief that multimedia users would find it worthwhile to load an operating system tailored to the kind of applications they use. Loading the operating system onto task-specific devices is taking the idea a step further and it could succeed.

Be showed a couple of its

own reference designs, including a web-access box. Designer Chris Sanders, who helped tweak the Be desktop for the designs, said: 'We are getting to the point where we can run on 16MB of Flash ROM and we support all the major web plug-ins like Java and Flash. Most of the web is nicely cross-platform.'

One idea is a home video editing appliance that might sit on top of a TV.

www.beeurope.com
www.bocaresearch.com

PROCESSORS

Rivals exploit Intel vacancy

Intel avoided Comdex this year, opening the field to its increasingly confident rivals AMD and Taiwan-based Via – both of which announced aggressive processor rollouts.

Via's profile was raised this year when Intel's 820 chipset, supporting the next-generation RAMBUS memory, was found to have a bug. An 820 has now been released, hobbled to two RAMBUS modules, but the hiccup gave a huge boost to Via's non-RAMBUS chipset.

Via is set to launch into the processor business, following its purchase of Cyrix's M11 and IDT's Winchip technology and design teams. Early in 2000 it will launch a PIII-class Celeron clone, codenamed Joshua, using the old socket 370, a 133MHz front-side bus and 256KB on-chip Level 2 cache. Initial speeds will be 433MHz and 466MHz.

Richard Brown, marketing director, said: 'Intel artificially limited the performance of the Celeron to avoid

competing with the PIII.'

The autumn will see a processor, codenamed Samuel, built around a Winchip core. Via is also working with S3 to pack its Savage graphics processor into a chipset.

Both AMD (see box) and

Via back Double Data Rate DRAM against RAMBUS for the immediate future. Brown claims DDR is good for 'at least three years' of increasing processor speeds, and that RAMBUS is difficult and expensive to implement for little or no performance gain.

AMD power-saving chips

AMD, which launched a 750MHz Athlon as Comdex closed, will incorporate radical power-saving technology called Gemini into its processors.

Gemini, like Intel's Geyserville, uses both voltage-dropping and clock switching to reduce power consumption. On mobiles it is triggered when you switch to battery power.

Intel is expected to launch its first Geyserville chips early in the new year, targeted at mobiles. AMD will launch Gemini-

equipped 0.18micron K6-2+ and K6-3+ mobile chips early next year and spread the technology to all its products over the years. Gemini requires extra pins on the K6 to control the voltage.

Its application to desktop machines will be seen as eco-friendly and will help cut power bills.

On the road map for next year are 0.18micron Athlons with on-die cache and using a new Socket A, based on the Slot A used by current Athlons.

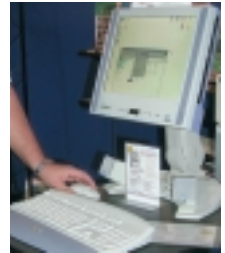
short stories

PC/TV PACKS PUNCH

UK-based Densitron showed what it described as a personal computational centre.

Called the Cassius, it is basically a multi-media PC/TV the size and shape of a thick LCD

panel. It packs stereo sound, DVD, FM radio and comes with a wireless keyboard and mouse. A 433MHz Celeron-based model will cost just under £2,000 inc VAT



WORTH A CLOSER LOOK

This \$99 Intel computer microscope didn't make it to Europe in time for Christmas but it looks fun. Anything you put under it appears on your computer screen, and the device detaches



from its stand so that, should you wish to, you could minutely examine the underside of your left toe. No date yet for UK shipping. www.intelplay.com

SPLITTING IMAGE

The oddest exhibit had to be Sanyo's projector, which provides 3D images without the need for special glasses.

The source image contains two images in successive adjacent pixels. An image splitter delivers one to each eye, giving an impression of depth. The splitter is controlled by a computer which is fed data from a sensor tracking movements of the viewer's head.

Applications are expected to be displays for pilots and surgeons. www.sanyo.co.jp

Palm puts CE in the shade

Windows CE seems to be losing ground, judging from the exhibits and the devices used by people on the floor, and Palm-like organisers are taking centre stage.

Everex said it is pulling out

of CE devices, Nokia and Sony said they are licensing the Palm OS, Philips has dropped the CE-driven Nino, and Compaq is considering using other operating systems for its web-access boxes. New CE devices were scarce.

Nokia is part of the Symbian alliance pushing the Epcoc32 operating system and its Palm deal confused some. But Symbian chairman David Potter told a Comdex seminar: 'Nokia will be using the Palm user interface on top of Epcoc.'

Office for hire, upkeep included

Microsoft showed the new version of Office, designed to be hired out over a network – where application service providers (ASPs) will run and maintain software for you on their servers.

Microsoft will itself be an

ASP, seeing this as a way of maintaining revenues as the upgrade market slows. The demo worked flawlessly over a local network but is also viable on a slow web link – only key presses and screen updates are transmitted.

GraphOn (www.graphon.com) showed Winbridge, which will allow Java-enabled browsers to run Windows applications. WinBridge, also targeted at ASPs, is seen as a way of running Windows apps on Linux boxes.



INPUT DEVICES

Upwardly mobile, yes, but the new appliances have yet to crack the problem of entering data.

Let your fingers do the struggling

The least addressed problem of current mobiles is the fact that they make poor input devices. The best in this respect are still Psion's keyboard-driven Series 5 and its new smaller sibling Revo, although both were getting scant attention on the company's stand at Comdex.

Handwriting recognition is in, even though on the ubiquitous Palms and their lookalikes it is just about good enough for the odd note – certainly nothing the size of this report, much of which I did on a Series 5.

Hence the popularity of keyboards into which Palm-like devices can plug. The neatest I saw was the collapsible one pictured below, but it is difficult to say how well this would stand

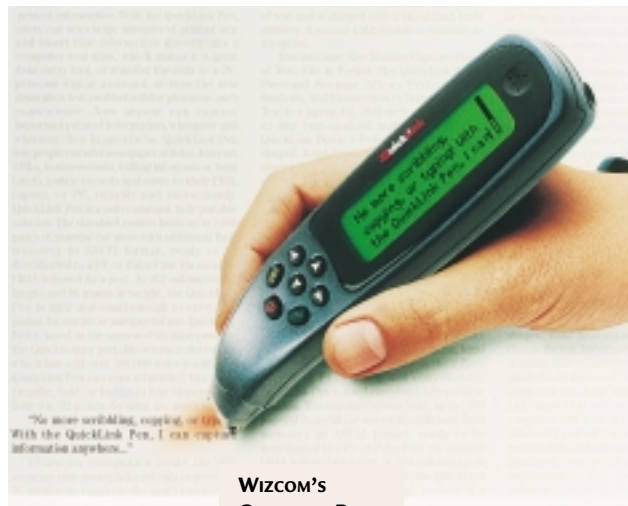
up to being used in earnest.

Whoever finally cracks this input problem stands to make a fortune, because it will transform the use of mobiles. Regular readers know my views (see millennium prediction, p21).

A related problem is that of getting information from the page to the computer. Optical character recognition (OCR) is easily good enough for routine office use but there are problems with its use in mobiles.

These are showing up in the first generation of smart pens, which pack organiser facilities with the ability to scan and OCR text line by line and store it for pumping into a computer.

Reputedly the best of the bunch is the C-Pen, which I raved about at Cebit earlier



WIZCOM'S QUICKLINK PEN IS DUE FOR UK RELEASE SOON

this year; this was not showing at Comdex and I have not had a chance to try it out. Uniquely, it also attempts to read your handwriting.

Seimens was showing its cheaper PocketReader, costing just over £100 in the UK. See <http://at.pocketreader.com/en/index.htm>.

Israeli company Wizcom (www.wizcomtech.com) was showing a similar device called the QuickLink pen, which it plans to launch shortly in the UK. I was able to try it out but, sadly, I could not get the PC link to work with the old Windows 95 laptop I was using (my sample was a beta version, so this does not mean the final model won't work).

But I did discover a problem: even 95 per cent correct OCR, which is possible, is not good enough for this kind of device, because if you get one digit wrong in a phone number, you have the whole number wrong. Even if you discover the mistake when you are in a position to change it, the input problem rears its ugly head again: correction can

take far longer than writing it by hand.

Hewlett-Packard's CapShare is easily the best mobile paper interface to date, leaving aside barcode readers. It is basically a battery-driven scanner with memory and some clever software that stitches together a full image from a single wiggly pass. HP was showing its CapShare 920, which includes automatic straightening and lets you crop the image on its built-in LCD – it will hold up to 50 pages before you pump them into a PC via 4Mbit infrared or a standard serial port.

This information is not subject to the caprices of an OCR engine: you can still OCR it on your PC but you retain the nearest thing to a hard copy as a fallback.

The CapShare has so far been too expensive to make it a big seller, but HP was offering it for \$299 at Comdex – \$200 under the list price. If that is a permanent price drop, HP will have a big seller. I bought one. www.capshare.hp.com



This \$99 (£62) Stowaway keyboard from Think Outside can be used with the Palm Pilot, but is seen here with the Visor from Handspring. This is a Palm-compatible mobile from the people who designed the original Pilot. On the back of the Visor is what the company calls a Springboard slot where expansion devices can be fitted. One prototype provides Bluetooth connectivity (see also p36). More info at handspring.com and www.thinkoutside.com.

CA

STORAGE

DVD variety adds to buyer confusion

The rival camps in low-cost rewritable DVD both announced they will ship 4.7GB drives in a move that will do nothing to ease confusion for buyers.

Hitachi showed its new GF-2000 4.7GB DVD-RAM drive, which is due to ship early 2000. It can also read and write current-generation 2.6GB disks. Hitachi also showed a DVD-ROM drive reading the disks, but this is its own make and they cannot be read by most current makes. Panasonic and Toshiba also support DVD-RAM.

The DVD+RW drives, backed by Philips, Hewlett-Packard and Sony will come

out later in the year; these too are said to have compatibility problems with existing DVD-ROM and DVD-Video drives.

Philips, however, showed its drive working with several makes. Adri Baan, vice-president of Philips Consumer Electronics, said compatibility was the main reason the company decided

to go with DVD-RW. He said it will ship a 4.7GB DVD+RW late next year – by which time he expected 10 million compatible DVD video players to have been sold.

The capacity of existing +RW drives, such as HP's DVD Writer 3100I, is 3GB – enough for 100 minutes of high-quality video.

For more specialised use there was a new 4.7GB DVD-R drive from Pioneer. The \$5,400 (£3,375) DVS-R4700, designed for DVD authoring and long-term archiving, uses write-once media, which can be an advantage when you don't want something overwritten. The disks are read by most DVD drives.

Sanyo gets the iD with rewritable optical drive

A rewritable magneto-optical drive packing 730MB onto 5mm disks was previewed by Sanyo. The iD drive, developed jointly with Olympus and Sanyo, is designed to go into devices like digital cameras.

This will put it up against IBM's smaller MicroDrive, which packs just 340MB per disk, but fits a standard Compact Flash II slot and is interchangeable with CFII flash

memory. MicroDrives with 780MB and 1GB-plus capacities are in the pipeline, but no shipping date has been set.

Sanyo says the capacities of its new drive will increase fivefold and they allow data to be rewritten at 20Mbits/sec more than one million times. Again, shipping dates are unknown.

www.castlewood.com
www.sanyo.com



New Jornada packs talking book

Just about every booth in Comdex appeared to have some form of MP3 player or software to go with it, a trend encouraged by the fact that MP3 has overtaken sex as the most searched-for word on the web. But Hewlett-Packard has realised

that music is not the only form of audio: taped books and other spoken material are becoming increasingly popular, particularly for drivers.

It has packed its new 430se Jornada palmtop with software to access more than 17,000 hours of spoken audio at www.audible.com.

It looks like an idea that is set to spread (perhaps even to the BBC).

The CE 2.11-based 430se, which uses a 133MHz 32bit Hitachi SH7709a with 16MB of RAM and 8MB of ROM, packs a speaker and mike and an audio headphone jack and also plays MP3 music.

Future looks clear for electronic books

Microsoft is to introduce a free Reader module designed to promote the idea of the electronic book. It uses ClearType technology – first announced last year at Comdex – and is claimed to make on-screen text more readable; it capitalises on the fact that single RGB components of an LCD

display can be addressed individually. It uses peculiarities of the way we perceive type, Microsoft says, but it is not revealing details until patents are settled.

ClearType does not work on CRT displays, because they cannot be addressed at the sub-pixel level. Microsoft says type is difficult to read on

screen, as large pixels cannot show its subtleties – in the same way on-screen type seems bolder with larger sizes.

Demos on Microsoft's stand appeared to give a considerable improvement to readability, with type as small as 7pt. The technology could make handheld electronic books more usable; devices

like the Palm Pilot and Apple Newton are already being used as ebooks, with several sites offering content.

A company called Rocket eBook showed a \$199 (£124) portable electronic book that can hold 41,000 pages. Try it on your PC by downloading an emulator from www.rocket-estore.com.

INPUT/OUTPUT

1394 is the lucky number

Rumours of the death of fast 1394 PC links are exaggerated – but there are mutterings about Intel trying to kill them off in favour of an accelerated USB. Microsoft endorsed the technology by hosting the 1394 Trade Association's booth.

1394 was developed by Apple (calling it FireWire) and is supported by Sony (which calls it i.link). It runs at 400Mbits/sec. 800Mbits/sec silicon is under trial; 1.6Gbits and 3.2Gbits implementations are on the way.

One likely use is in set-top boxes: at least one company is investigating the feasibility of implementing 1394-based copy control which would let a content provider dictate whether a programme or film

can be copied – and if so, how many times the copy can be played.

This would

'Unless USB 2.0 runs at four times the 240Mbits/sec it's due to reach in 2001, it won't catch up.'

The future of Device Bay, the use of slot-in peripherals fitting standard bays linked by both USB and 1394, looks far from certain.

Bob Wede, sales manager of Granite Microsystems, which was showing a Device Bay stack, said there was a lot of interest. But the only other Device Bay (also made by Granite) was on the Lucky Goldstar booth, on a monitor (see left).

www.1394ta.org
www.1394showcase.com



STRANGELY, SONY CHOSE NOT TO USE I.LINK IN ITS NEW DCM-M1 DIGITAL CAMCORDER. INSTEAD IT HAS AN OPTIONAL ETHERNET LINK

curb piracy of high-quality digital content and let copyright owners charge for repeats – but 1394 experts we spoke to doubted the system would be foolproof.

Plans for a new USB 2.0 to support data rates up to 240Mbits/sec, possibly 480Mbits/sec, prompted speculation that Intel planned to displace 1394. However USB 2.0, fundamentally Intel technology, is itself under fire (see below) and 1394 has a lot of momentum – it has already shipped, for instance, in seven million camcorders.

James Snider, head of the 1394 Trade Association, said:

Some 1394 products

- UK-based Oxford Semiconductors showed a chip allowing manufacturers to transform IDE into FireWire drives.
 - VST showed a series of 1394 drives with capacities up to 14GB and supporting hot-plugging.
 - Dolby showed 1394-driven speakers.
- www.oxsemi.com
www.dolby.com
www.vstech.com



LUCKY GOLDSTAR'S 19IN STUDIOWORKS 915XU HAS TWO DEVICE BAYS

USB is round the U-bend

USB 2.0 proposals have been criticised as trying to stretch a cheap, slow technology beyond its natural limits.

Critics say that the mix of slow and fast devices on the bus mean it could never reach its projected 480Mbits/sec. This is because juggling with its three speed modes – 1.2Mbits/sec, 12Mbits/sec and 480Mbits/sec – leads to either wasted

bandwidth or to one device hogging the pipe. Even on USB 1.1 the bus rarely approaches its theoretical capacity.

USB was designed to eliminate PCs' multiplicity of ports, some of them ludicrously outdated (the RS232 port has 25 pins for a serial link requiring two).

US analyst Maurie Wright described updating USB as like 'polishing a turd'.



comdex shorts

THE TIME THE PLACE
You'll never get lost wearing a wristwatch, not if it is a Pathfinder from Casio. It uses satellite positioning to tell you the latitude and longitude of your position, how fast you are going, and the distance to your destination. Oh, and it also tells you the time. No prices or UK release date were available.



www.casio.com

MOBILE DOCKING
Mobility Solutions showed its EasiDock range of 32bit Cardbus PC Card-based universal docking stations, offering transfer rates a claimed 100-times faster than USB-based products. They will sell in Britain for £229 ex VAT with the usual PC ports; top of the range includes drive bays and PCI slots. Also shipping will be a £110 ex VAT USB hub with all legacy ports – £30 more with an Ethernet link. Contact Mobility Electronics on 01189 840400.

www.easidock.com

SECURITY CONSCIOUS
Israel-based IRLan was plugging modules for diffuse infrared networks operating at up to 10Mbps/sec. They are useful where security is a priority, as unlike radio, IR does not pass through walls.

www.irlan.co.il

IMAGES ON DEMAND
A camera with a built-in modem that can link to a remote PC and capture images on demand was shown by Taiwan-based 3Jtech.

www.a3j.com.tw

TALKING NET
Philips is giving away a plug-in for Navigator and Explorer browsers which will allow you to surf the net by voice commands.

www.myspeech.com

BLUETOOTH

Avoiding teething problems

Demonstrations of Bluetooth devices talking to each other are getting tedious in the absence of actual products, that will not ship until next year. But the short-range wireless technology had its own pavilion at Comdex and a new (and rather good) buzz phrase to describe it – personal area networking.

I was told that much of the US-branded Bluetooth technology on show had come from companies around Cambridge, though Denmark-based Digianswer had a presence. Vendors are determined that Bluetooth will not go the way of infrared links, the reputation of which has yet to recover from early teething problems.

Glenn Collinson, marketing director of Cambridge Silicon Radio, said the first of a series of plugfests was being held in Europe even as we spoke to test how products from different manufacturers worked together.

I pointed out that plugfests were held to demonstrate the interoperability of early PC

Card slots and cards, but these too were plagued with teething problems. 'That is true,' said Collinson, who was promoting CSR's one-chip Bluetooth modem. 'But each Bluetooth device will have to go through a certification process before launch.'

(CSR's technical director James Collier, who attended the plugfest in Europe, said back in Britain there had been a 'great spirit' between the rivals to ensure that Bluetooth succeeds. 'We all know we have to get it right,' he said.)

Compaq's TaShana Jett, consumer mobile product marketing manager, said work is under way on a Bluetooth and SWAP (see below) home-networking chip, offering short and medium-range links. 'They are similar technologies. It would cost \$2 per chip to add Bluetooth,' she said.

● London-based TDK showed a Bluetooth PC Card to ship in the second half of next year.

www.digianswer.com
www.cambridgesiliconradio.com/

CLIVE AKASS



It'll be all the rage this season

It seems that no Comdex can be without a display of wearable PCs, though as a fashion accessory this one from Xbernaut leaves a lot to be desired. However elegant your dress, it is hard to look cool when you are squinting at a mini-display.

www.xbernaut.com

Home is where the network is

A battle is brewing over home networking, which is expected to boom with the advent of broadband links. Standard Ethernet cards and cable remain the cheapest option, but HomePNA networking, which uses phone cable, should beat them on price.

Netgear showed off a HomePNA 2.0 range at Comdex, boosting data rates to 10Mbps/sec. Prices for a PCI or USB node start at \$80 (£50), including software.

Actiontec showed 1Mbps/sec Home PNA 1.0 cards at \$69.

Preferable, but more expensive, is wireless RF with a choice of 11Mbps/sec 802.11 (wireless Ethernet) and the HomeRF's Shared Wireless Access Protocol (SWAP), a 1.6Mbps/sec version that includes DECT voice links and is cheaper.

Proxim, whose Symphony range uses a proprietary protocol, said it will launch its first SWAP products next year, bundled with Compaq

home PCs at \$100 a node. Compaq sells 802.11 to its corporate customers at £200 a node. But Apple's Airport cards are only £79 inc VAT in the UK, and £239 inc VAT for the base station.

Intel backs HomePNA and SWAP. 3Com was backing two camps, with PCI and USB versions of its HomePNA HomeConnect kit, and the latest 11Mbps 802.11-based AirConnect wireless kit.

www.netgearinc.com
www.actiontec.com

Not handhelds but handholders – Internet appliances are your future guides to the web.

Plug and surf the friendly way

There has been a lot of discussion on what is being called the Post-PC era and a shift towards information appliances. I tend to believe that it is rather the PC-plus era.

PCs are not going away any time soon. They will remain the most versatile tool for media processing, although their function will shift from mainstream productivity. They will be used as a digital studio to handle still and motion video, as well as integrate these media into all types of multimedia and information related content.

The slow rollout of high-speed bandwidth will delay the uptake of information appliances, although these have a great deal of merit. Some, such as web phones, will be application specific.

But information appliances in general are starting to fall into two key categories. The first is what is called the Internet PC, based on the Intel/Microsoft Easy PC specification; they are also known as legacy-free PCs (see page 24).

The other category that is emerging is known as web companions. Microsoft is championing this concept and specifically tying it to a new program it launched at Comdex, along with partners Vestel, Philips, Thomsen and Compaq.

Web companions are actually hardware devices that use Windows CE as the core OS, but boot up directly to Microsoft's MSN web-access service. The device itself will cost anywhere from



▲ PROTOTYPE WEB COMPANION FROM VADEM
 ► ACER'S I-STATION

\$199 to \$499 (£124 to £312) but there is a monthly fee for using it on MSN. Think of it as Bill Gates' way to get around any DoJ moves to force him to unbundle IE from the OS.

Now, instead of



giving Bill Gates his \$50 one-time fee for a licence to Windows, users would now give him a monthly usage fee of \$24.95 – of which the hardware makers will get a slice. This is a big win-win for Microsoft and partners, but because these devices can use any processor that Windows CE runs on, it is a potentially big loss for Intel.

The other big direct competitor to Microsoft in this space will be AOL. It is working on hardware devices

that boot directly to its service in the same way, but it plans to OEM a single device for use as a direct Internet companion or front-end to a TV.

By far, Microsoft's enlisting of

dedicated ISP and web interface.

The charge is again \$24.95 per month, complete with an environment that is very easy to use and navigate.

Games systems such as Sony's PlayStation II, which comes to market in Japan this spring and the US next fall, is also an Internet appliance. It uses a DVD-ROM drive to

deliver the games, but since it is based on DVD, it can play movies as well as audio CDs.

However, it has two USB slots, two PC card slots, a flash card slot and a video-out port. This means that third party vendors can add, via the USB ports, external hard drives, modems, and who knows what else to let it become a serious Internet appliance in its own right.

This area of Internet appliances is so hot that IDC has predicted that while we will sell 15.7 million PCs this year, we will sell over 18.5 million

Internet appliances in 2002, which will represent about \$15.3bn in revenue above and beyond PC sales in the same year. If Comdex's Internet showcases are anything to go by, we are going to see a multitude of innovative products under this Internet Appliance heading, that will let people all over the world connect to the Internet easily and inexpensively.

TIM BAJARIN

ONLINE BUSINESS

Clive Akass asks why the FT and others are encouraging free access rather than charging fees.

Free information makes a comeback

The web entrepreneur has become such a figure of our times that it's easy to forget that in the early days of the web there was considerable opposition to opening the Internet up to business. Proponents argued that if people could not sell good content, there would be no incentive for them to post it.

This was seen as a good point, even by the wackiest of Internet pioneers. Yet the web has confounded expectations and we have seen a drift back to free information.

Perhaps the best-known example is *Encyclopedia Britannica*'s announcement that its site (www.eb.com) was dropping its subscription fee – prompting so many hits that it was overwhelmed for days.

Most newspaper and magazine sites (including our own) are still free. You can access not only a selection of current news but also archives, a facility that would have cost you a fortune five years ago. In many cases publications are trying to build online readership ready

for the day when charges can be imposed.

You may have seen the *Financial Times*' adverts offering free access both to its site and its extremely valuable archives. The impression given is that this is a

temporary offer, but we understand that it is indefinite. If you take myself as an example reader, the *FT*'s strategy seems self-defeating at first glance. It is one of several papers I scan for technology news – I pick out the bits relevant to my work

but have little time to read the rest. Recently the *FT* took to emailing me items that my profile shows I am interested in – it has done my scanning for me and there is little point in my buying the paper.

Peter Martin, editorial

large papers are still making do with one man and his dog.

Both the *FT* and the *Encyclopedia Britannica* anticipate revenues from targeted advertising: if you search for 'lesser spotted widgets' you may get, next to your results, adverts from firms selling them. In principle it is no different from IT advertisers targeting PCW because of our readers' interest in IT.

The distinction between an advert and a shop is less clear on the web, however, and further revenues may be obtained from transactions that come from a particular page.

Some sites will undoubtedly charge in future for content that is currently free. One factor holding them back is the lack of a globally accepted

method of performing small transactions: you could buy a tank more easily than a box of matches on the web.

But we will soon routinely chuck in a few virtual pennies to buy an ezine, or some other form of cheap content. Sites such as <http://fatbrain.com>, where authors can post writing for sale, are already preparing for the day. Again, this could affect the finances of traditional publications and force a rethink of online business models.

The biggest change will come when web ergonomics mature: paper is far more convenient to read than any display; but it has little competition in today's slow and unwieldy access devices.

Crunch time for traditional print will come when you can read your web-delivered news or mail on a paper-thin device in the bath.



Web winners

The winners of the third annual *Financial Times* Business Website of the Year awards, co-sponsored by UUNET and PricewaterhouseCoopers, were:

- Website of the decade: Yahoo for its MyYahoo.com site
- Large organisation: IBM
- Finance sector: Terra Nova, online insurance products
- Small-to-medium enterprise: ComponentSource's shop for software components
- Site to watch: beenz.com, a web currency for online transactions
- Public sector: BBC Natural History Unit, online picture library service

Bond meets mobiles

THERE was time when the high-tech gadgetry of the latest James Bond movie seemed the stuff of fantasy. The reality gap is closing fast, spurred on by developments in mobile telephony.

An emerging force is UbiNetics, which was set up a year ago by PA Consulting to capitalise on its work in both GSM and third-generation (3G) UMTS (Universal Mobile Telecommunications Systems) technology.

Ali Pourtaheri, who heads UbiNetics, is already predicting that his firm will overtake



ARM (another Cambridge prodigy, currently worth £4bn) by 2005. 'UbiNetics will be the future British Ericsson,' he boasted.

Big words for a company that launched with just 15 people and now employs 100, predicted to rise to 350 by December 2000. Product ideas being evaluated include a wrist-borne video-telephone – controlled by a finger mouse – that will also transmit and receive email. Mobile phone users in Japan may be among the first to use it – for viewing partners at a dating agency.

Another idea involves spectacles that operate as a video viewer, via a wrist-strap receiver. First off the production line, however, will be the credit-card-sized

engines that will bring audio, video, and Internet data to the next generation of mobile phones.

UbiNetics designs and develops its products as part of an alliance with Texas Instruments and software consultancy Condat, a leading supplier of GSM protocol software.

'At the moment our GSM focus is on data-centric applications and specialist voice terminals, for use in anything from car management systems and telematics to vending machines. In the future it will be everything in the PDA area and voice-capable handsets,' said

Pourtaheri, who was responsible for Ericsson's global GSM product-line management.

He believes calls for a standard for 3G mobile phones could be irrelevant following UbiNetics' development of products covering 85 per cent of existing technologies. It has developed a 3G test mobile that works on a variety of 3G networks worldwide.

'Our test mobile gives network manufacturers the ability to do practical trials on 3G networks,' said Pourtaheri. 'It will give them the evidence they need to invest in 3G and to work together without a global 3G standard.'

He added: 'We are signed up with a number of leading manufacturers. We are ahead of the competition because of our technological lead in the third generation of mobile telephony.'

www.ubinetics.com

Caroline Swift



reports from Silicon Fen

Hacking his way to celebrity status, Kevin Poulsen highlighted security issues at ComSec 99.

On the straight and narrow – not

If you were called upon to cast Kevin Poulsen, you'd have to choose someone like Dustin Hoffman in *Midnight Cowboy* mode: thin, streetwise and sharp – but not so sharp as to stay out of trouble.

Poulsen's version of his story sounds like something from a comic book. He was arrested, but not charged, at the age of 17 in 1982 for gaining unauthorised access to ArpaNet, the precursor of the Internet.

He dabbled in phone phreaking and in 1986 the FBI claimed he had been delving into government computers and slapped an espionage charge on him – which meant he would have to stay in jail while they figured out how to make it stick. 'The way I saw it, they were going to get me and there was no way I was going to stop them. So I went underground,' he said.

While on the run he supported himself by cheating in radio phone-in competitions – by hacking the phones. He won a Porsche 944-S2 Cabriolet and a holiday in Hawaii. 'I sold them because I had to. To me this was a job.'

The FBI caught up with him in 1991 and he spent five years in jail before a judge threw out the espionage charge. 'They gave me five years on other charges – stuff, like winning the Porsche, that I'd done to survive when I went underground. I'd already done that time so they let me out.'

He added drily: 'Now I have hit rock bottom. I'm in the gutter. I'm a journalist.'

That some people have a rather different view of his career can be gauged by the

title of Jon Littman's book on the subject: *The Watchman – the twisted life and crimes of serial-hacker Kevin Poulsen*.

Poulsen was one of two celebrity hackers at London's ComSec 99 conference on computer security; even in a suit he contrived to look a trifle louche.

Perhaps it was the wisp of a goatee, the earring, and the gravity-defying kiss curl.

With him on the platform was the Cult of the Dead Cow's Sir Dystic, author of the Back Orifice (BO) suite, which will give you the run of an NT network if you can find one dumb enough to allow you to install it. (A more powerful Back Orifice 2000 has just been released).

He too gave a robust account of himself. BO was written not to intrude on networks but to expose their weaknesses, he said. 'Microsoft is basically run by the marketing department. So Microsoft programs feature what the marketing department says people want. I've spoken to programmers there and they have told me. They had a priority list of things to do, and security was down there at something like number 17. Do you think they would have got round to it before we made security an issue?'

This song of injured innocence went a little off-key later when he got heated about people who send junk mail, as if this were somehow worse than handing out

potentially devastating code to Internet delinquents.

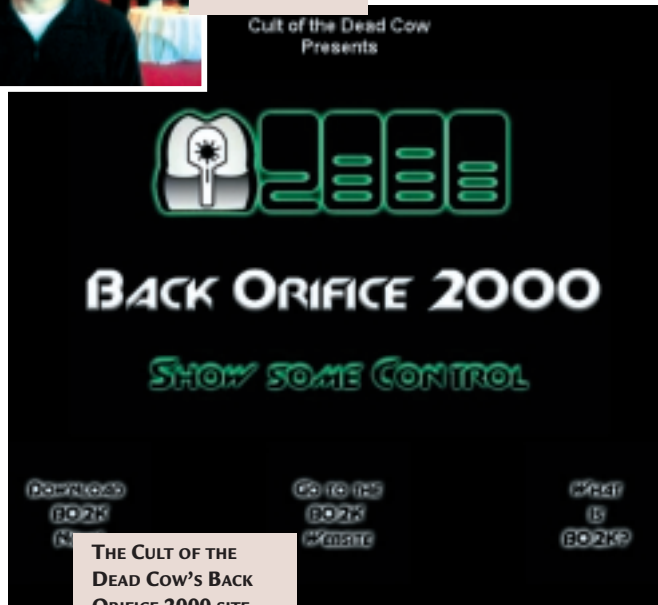
But this was very much par for what was a very odd occasion. The celebrity hackers, you were forced to remind yourself, were talking to the men whose job it was to stop them. True, both were

criminal potential of their skills, though both had been approached by criminals.

Sir Dystic said he believed more than 90 per cent of hacking was done by kids scanning IP addresses for a vulnerability. He told me: 'When someone calls a server it sends all kinds of information about what software it is using. There are lists of vulnerabilities in each



POULSEN AT A SEMINAR IN LONDON – AFTER CHANGING HIS SUIT



now on the side of the angels (Sir Dystic was there working for a security firm) but they had a remarkably sympathetic audience. One of them told Poulsen: 'A lot of people thought you were being hounded.'

Others came close to thanking the hackers for keeping them in work and making their lives easier by highlighting security gaps. Try that excuse next time you are caught robbing a bank.

The celebrity hackers, it has to be stressed, were against vulgar thefts and indeed were scornful of the

piece of software. All the hacker needs to do is look them up and exploit them.'

Both said the biggest vulnerabilities were in people: the easiest way to rob a bank is to bribe a bank worker. What's the point of trying to hack credit-card details when you can get them from bills scattered on the floor of almost any supermarket?

Poulsen said: 'You can get into practically any system if you really want to. But it would not be economically viable.'

● Threat to email – see page 58

CLIVE AKASS

SECURITY

Raw email 'no longer safe'

The fond belief that no-frills email is safe may no longer be true, according to a security expert. The danger usually lies in attachments, which can contain executable code such as the Melissa macro virus, a new variety of which was found last month. Anti-virus programs now scan for these routinely.

But PCs can be vulnerable if they use Microsoft Outlook with HTML viewing enabled, anti-virus freeware author Padgett Peterson said at the

ComSec 99 security conference in London.

'The HTML can contain an embedded script which calls up code from a remote computer,' he said. It might even be possible, with some versions of the software, to penetrate a company's firewall to do this.

A worm exploiting a similar idea was reported only days later by Norman Defense Systems. It relies on an ActiveX control, incorrectly labelled as safe; when the email is

opened, it drops a file into the Windows start-up directory which, on the next boot-up, sends the worm to every address listed in Outlook.

The worm is not yet in the wild but Microsoft has created a patch, the company said. Details are at www.normanuk.com.

Pure text seems to be peril-free. Of course, HTML is pure text and if you send it as such Outlook does not execute it; if you send it as flagged HTML from within Word,

Outlook treats it as HTML.

But there is no way of telling the difference on your email listing. HTML mail will execute when you click it without the usual warning box; attachments have to be launched separately, although macro viruses can auto-execute when you open an attached document in an unprotected system.

One in every thousand emails carries a virus according to a study by Worldtalk Corp.

Chiefs ignore own advice

Security chiefs admitted last month that they didn't take even the simplest precautions to stop attacks on their own machines.

Consultant David Aubrey-Jones asked ComSec 99 delegates, most of them responsible for security at major firms, two questions: whether they had downloaded the latest patches from Microsoft; and whether they had checked the default Internet security settings on Windows. In each

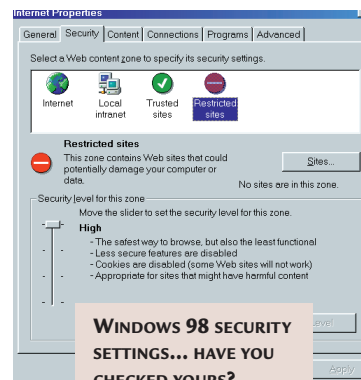
case only a minority of hands went up.

Aubrey-Jones said it was vital not to let your guard drop at a time when hackers worldwide shared the latest tools and vulnerabilities. He listed the various forms of attack that browser and email clients can face and said some measure of protection could be gained by setting the security levels right in the Internet control box.

Cookies, which allow one page to pass information to

another, are less of a danger than ActiveX or Java, but they can constitute an invasion of privacy, he said. Cookies sent by DoubleClick servers, for instance, give your machine an ID that is returned to any other DClick site and helps target ads by compiling a list of which pages you look at.

There is no satisfactory answer, unless you buy software such as IEClean or



NSClean to sweep out cookie files, Aubrey-Jones said. If you turn cookies off, sites may not work and cookie prompts can become irritating.

Linux lags on security

Linux does not yet match Unix on security and its distributors need a common standard to ensure users get basic protection, a security expert said.

Stan Dormer, of Stan Dormer Associates, looked at security in boxed distributions from Red Hat, Caldera, and SuSE.

He said access permissions varied and he could find only conflicting, indigestible information on recommended permission sets. He asked: 'Why on earth can't more software distributors agree on a common standard for their packaged operating systems yielding a known level of security?'

He said savings on the software were offset by the 'administrative overhead needed to make the system secure'.

The fact that Linux code can be modified casts further doubt on its security. 'Changes are implemented on a more ad hoc basis than the cumulative fix-pack mentalities of the mainstream software vendors. New components... can be downloaded freely from the Internet with various degrees of provenance and reliability,' he said.

He concluded that by comparison with Unix, AIX or NT, Linux 'can at best be seen as a looser and less trustworthy assembly'.

Full-cover

Problem: A bug in Microsoft's Java Virtual Machine under Explorer 4.0 and 5.0 lets Java applets out of their 'sandbox'.

Solution: There's a patch at www.microsoft.com/java/vm/dl_vm32.htm

Problem: Bug in Netscape and Microsoft email readers caused a buffer overflow allowing hackers to insert code.

Solutions: www.netscape.com/products/security/resources/bugs/1on and www.microsoft.com/jie/security/?/ie/security/oelong.htm.

Gordon Laing looks for the technology with **the right connections** to control home networking.

The missing link



I reckon the big thing over the coming year will be home networks. Very soon there'll be home entertainment systems where one box will have good reason to speak to another and share its capabilities: 'I had no idea you could receive TV and

record hours of it,' said the PC to the VCR – to which the VCR replied: 'Hang on a minute, you're saying you can connect to any other computer in the world?!'

I recently managed to grab a few minutes with Bob Metcalfe, founder of 3Com, inventor of Ethernet and popular pundit. The obvious question was 'Bob, what networking system will connect devices in the home of the future?' Metcalfe pondered for a moment, looked me in the eye and said 'Ethernet' before striding off to more interesting interviews. I felt a little disappointed, and for a fleeting moment considered Metcalfe to be a one trick pony. But then again, maybe he's right. Ethernet is cheap, easy to implement in modern PC operating

It's CERTAINLY TEMPTING to think of a load of consumer electronics connected only by a single daisy-chain of FireWire

systems, and most impressive of all, is a widespread, proven technology that works. It's also available in fast and wireless flavours. Trouble is that no-one seems to be in any hurry to fit it to the back of your TV.

I still believe FireWire has a strong chance of becoming the backbone of future home networks. It's quick (supporting up to 400Mbit/sec), easy to use, allows devices to be connected and disconnected while they're switched on, and – most crucially of all – is a peer-to-peer system, not requiring a host PC or Mac to control the network unlike, say, USB.

It's easy to lose sight of this important capability, especially as we enter another numbers game. Keen to ensure we appreciate USB, its members have announced that version 2.0 will boast speeds up to 480Mbit/sec, and be with us by, er, the end of year 2000. The 1394 Trade Association, which was last seen looking worried at Intel's Developers' Forum, recently countered at the Comdex show that FireWire would be finally upgraded

to 800Mbit/sec at the beginning of 2000. Numbers aside, remember that FireWire is the only digital networking technology that can work peer-to-peer and is currently found on both consumer electronics and PCs – albeit only a handful of them so far.

Panasonic has, however, released two very exciting products in the US: an HDTV set-top box receiver, and HDTV D-VHS recorder, both fitted with FireWire. These really are a nod to the future, where a chain of FireWire-equipped devices share digital facilities as if they were one single super-system. The concept of using FireWire as the transport was actually defined as long ago as 1988, and called Home Audio Video Interoperability, or HAVi for short.

But what would control this system? While I believe the PC will be in there somewhere, for enthusiasts who desire power and application flexibility, I reckon the control centre of most home networks will be something like Sony's forthcoming PlayStation 2. This miracle console plays DVDs, CDs, fantastic games, boasts FireWire and USB ports, and looks pretty cool too. I'd sooner use this to quickly access my email than wait for my PC to start up.

It's certainly tempting to think of a load of consumer electronics connected only by a single daisy-chain of FireWire. But beyond DV camcorders, what consumer boxes are currently available with FireWire in the UK? Sadly current DVD players do not feature

FireWire outputs for fear of unprotected digital piracy. Our Digital TV set-top boxes currently receive and decode MPEG2 but don't feature FireWire ports either. I remember removing an engineering panel of an early digital TV box and finding a port 'for future use' which looked pretty much like FireWire to me.

Even if we could link all these devices using FireWire, the transported data may not be in the appropriate language. DVD, Digital TV and Panasonic's D-VHS all employ MPEG2, whereas digital camcorders currently use a format called DV, which is not dissimilar in practice to Motion-JPEG. They are not compatible, and no amount of FireWire ports will let a DV Camcorder record the digital output from a DVD player or Digital TV set-top box. Perhaps what we'll need is some kind of powerful processing box to convert video formats across the home network. Will the mighty PlayStation 2 rise to the challenge? Don't throw away your PC just yet.

gordonl@pcw.co.uk

Barry Fox is philosophical over the DVD-format battle, because Sony is setting its own standards.

To DVD, or not to be



We are now heading into one of the most important standards battles since VHS vanquished Beta and IBM's move into personal computers competed head-on with the pre-DOS plethora of home formats.

Both CD and DVD were launched as agreed industry formats, and DVD is now smoothly replacing CD, since new DVD drives can play old CD music discs and ROMs. But there are now five ways of using DVD to record audio, video and data.

It's too late to agree a common choice and the stakes are enormous. Whichever system becomes the *de facto* standard will dominate the future of digital storage.

The result is a war of words, with claims and counter-claims, muddled by hype, misinformation and ignorance. The only safe basis for any decision or opinion is fact.

Building a digital video disc recorder is a tall order, because most video signals are still analog and must be converted, on the fly, into the MPEG2 code used for DVD. Because it is working in real time the recorder cannot use the DVD-Video trick of saving bits by varying the data rate to suit the picture content (more bits where there is fine detail and motion, and less for static images). Several companies have

developed prototype single-chip encoders and the cost will fall, but they work at a fixed bit rate. So storage capacity should ideally exceed that of a pressed DVD.

The 'official' erasable DVD format, approved by the DVD Forum, is DVD-RAM. Several manufacturers (Hitachi, Toshiba and Panasonic) already sell RAM recorders for computer use. Like CD-RWs, RAM discs rely on a phase change coating which records the information as reversible changes in reflectivity. But the changes are so small an ordinary DVD-ROM drive or DVD-Video player can't read them.

Future drives will achieve playback with variable laser sensitivity, but this is no consolation to owners of existing hardware. Likewise, existing DVD drives and players cannot accept the protective caddies in which RAM discs must be housed.

The capacity of DVD-RAM has so far been limited to 2.6GB, whereas pressed DVDs have a capacity of at least 4.7GB. Panasonic claims improved laser optics can track the blank disc with sufficient accuracy to store 4.7GB.

Pioneer has a semi-official phase change format

called DVD-RW which also matches the capacity of pressed DVDs. This builds on the official DVD-W, write once, format which is compatible with existing DVD drives. But Pioneer admits that existing players will need modification if they are to play -RW phase-change discs.

NEC has another variation on the same theme, dubbed GigaStation. This uses Multimedia Video Disc, which looks like the official standard DVD-RAM, but stores 5.2GB per side instead of the 4.7GB promised for DVD-RAM. No backwards compatibility is claimed.

Philips, Sony and Hewlett-Packard opted for a completely different format which they call DVD+RW. The DVD Forum frowns on it.

DVD+RW also uses a modified phase-change system, but Philips claims that +RW recordings will play back on existing DVD-ROM drives and DVD-Video players.

At the recent IFA consumer electronics show in Berlin, Philips 'proved' this by shooting the press, recording the images on +RW discs and letting people choose which of a wide range of players to use for playback.

This sent the clear message that DVD+RW is the best bet for erasable DVD, regardless of whether the format has the official blessing of the DVD Forum, or not.

During IFA, Pioneer people were hinting darkly that Philips had rigged the demonstration. Weeks later,

The stakes are enormous. Whichever system becomes the *de facto* standard will DOMINATE THE FUTURE of digital storage

in Japan, Panasonic's Sakon Nagasaki told American journalists the same thing, saying that any manufacturer who claims two-way compatibility 'is not telling the truth'.

Philips denies this, but has declined the invitation to send a +RW recording for us to try on consumer players.

Sony, however, has now scrapped DVD+RW as an audio and video home recorder. Its plan is to use a 5in erasable disc, and 515nm blue laser, storing up to 20GB of data on a single side. The move was prompted by America's adoption of a high definition (HD) digital TV system, for which a 4.7GB DVD would be inadequate.

A 20GB disc could record a whole HD movie per side and, incredibly, back up a full PC hard disk on a blank.

barryf@pcw.co.uk

From planet-wide communications to **global domination**, Brian Clegg plots fibre-optics' future.

Let there be light



There are two big drivers for the frantic pace of IT development: games players – demanding photo-realistic graphics – and businesses with their ever-growing databases (actually there are also the computer manufacturers, enticing us to

buy the latest product and fill their pockets, but let's ignore them). As we demand more and more throughput to handle this flood of information, the poor old electrons that zip around carrying data inside computers are groaning under the strain.

Perhaps it's time to hand over to something more lightweight. In fact, to light itself. The idea of computing with light is not new. Some time ago it was suggested that tired transistors could be replaced by faster optical devices, but the idea proved to be beyond current technology and nothing came of it. Elsewhere, though, light is taking over. In fibre-optic cables around the world, light has become the transmission medium for telephone calls and the Internet. The curiosity that a

to a peripheral or nearby computer. Free light is much less fussy. You can pass two beams through each other without problems, there's nothing to stretch and tangle.

So, with light in mind, let's revisit those business databases. Mass storage technologies suffer from bottlenecks. If you really want to get value out of your huge customer database (or whatever), you need to sift vast quantities of data with immense speed. One answer to this is to hold the whole database in memory, assuming memory prices collapse enough that the thought of terabytes of data sitting ready for access is practical. Another approach is holographic storage, keeping oodles of information on a compact crystal of which Mr Spock would be proud. Already viable in the labs, holographic storage should be with us very soon now. But whichever approach you take, there's a problem when you try to use the data, because you just can't get enough pins into a chip.

Memory databases or holographic stores can dump out an immense quantity of information at once, but there isn't a lot of point unless you can do something with it. If, instead of a series of pins to send the data down you could have a light array, the surface of a chip or crystal could carry millions of bits simultaneously. In fact, there's already a machine funded by NASA under development, which is intended to handle petabytes (the next step up from terabytes) of data in a second. Just to put

that into context, it's the equivalent of every book in print in the English language passing by in about a quarter of a second. Without light as transport it would be impossible to shift the data at this speed, wherever it is coming from.

While these head-spinning volumes are restricted to the specialist market, there will be repercussions for the average PC. Apart from anything else, free-space optics would make it practical to have a computer that was made up of individual components, which could automatically link into the system when you brought each of them into proximity. Do you want to add a new hard disk? Simply put it on your desk and it's part of the system. Judging by previous developments, the hardest thing will not be the technology but getting manufacturers to agree on standards and not to go it alone. Either way the light revolution is on the way.

There's already a machine FUNDED BY NASA under development, which is intended to handle petabytes of data in a second

Victorian observed when a beam of light followed a spout of water pouring out of a tank has gone on to banish copper and electrons.

So, why not use light to connect the innards of a PC? Your processor isn't trying to send information around the world, just across a few centimetres. Inside the confines of the casing there is no need for the wasteful back-and-forth bouncing of fibre-optic's internal reflection. It's practical to send information pulsing around in a web of light. The scientists working on such computers give the technology the romantic-sounding name of free-space optics.

There are more advantages to this than just speed. Changing electrical fields in one wire have a bad habit of influencing nearby wires – it's hard to prevent cables and components from interacting in the confined PC box. And the topology of cables is limiting, especially when you want to send information outside the casing

brianc@pcw.co.uk

David Fearon, our new columnist, comes in from the cold to lament the loss of the Internet spirit.

Sold to the highest bidders



I should be happy, but I'm not. I recently returned from three months floating around in the Arctic (no, really) to find that the world has gone Internet barmy. Of course the computer press has been Internet barmy for years, but suddenly in the

last quarter of 1999, the floodgates have opened and every other TV commercial is for a free ISP, telecoms company or website. The Internet has suddenly been introduced to the public at large.

But here's the problem. TV commercials aren't called commercials for nothing – they're designed to make money by selling a product or service. So watching TV could give the distorted view that the Internet is some kind of commercial venture.

Fair enough, you say, but it's not as though we've all suddenly become slaving consumers and forgotten the Internet's roots. No, stupid, not the packet-switched military network designed to weather a nuclear attack: the other set of roots, the one where the Internet is an

It feels like BIG BUSINESS HAS BEEN WAITING IN THE WINGS, ready to pounce on the web and permanently hijack the thing

academic tool for the free exchange of ideas, destined to unite humanity and transcend small-minded governmental boundaries, etc.

Well I know that, you know that, and millions of middle class 20-somethings around the world know that. But outside our technological bubble, the majority of the planet's six billion may not have been informed of the way The Future is supposed to be. And I'm not only talking about developing countries, I'm including the majority of Britain's population, who until 1999 knew little or nothing about the web, and cared even less.

Enter the Internet money-making machine, a force so powerful it's managed to warp the laws of economics, so that loss-making companies with no assets are valued at millions of pounds. The machine tells the consumers, via this sudden explosion of mass media marketing, that the Internet is for all things commercial, a gift from the gods when it comes to finding the lowest quote

on your insurance or picking up a last-minute flight.

I'm not denying this is a good thing; in fact it's a marvellous tool for saving us all time and money. But the vast majority of the public is being exposed to just this one, narrow definition of the web, because that's where all the money gets made.

Okay, so you can accuse me of being deliberately cynical here. Those free ISPs that I'm casting as the villains of the piece all offer free web space, so any member of the public can have the voice to say what they want to say and it'll reverberate around the world at the click of a mouse. Fine, but most people, we are constantly told, are unable to program their video recorders. Thus, any device more complex than a video recorder is going to make the experience of spending money over the Internet prohibitively tricky. That's why cheap web appliances, not complex, expensive, crash-prone PCs, are what Joe and Joanne Public need.

Ever tried sending an SMS message on your mobile phone? It's a pain, because the phone isn't really designed for it. Web appliances will suffer similarly, being designed for accessing information, not creating or sharing it, and despite what anyone says, publishing on the web is difficult whatever device you're using.

But, I hear you retort, an information access device doesn't have to be used exclusively for shopping. It can still be used for accessing all the information you would be able to access with a normal browser.

True enough, but you can bet the companies that will be subsidising the boxes to connect to your TV aren't going to be particularly happy with people using their hardware in a manner that can't be turned into profit at the end of the day.

This is an exciting time. History is being made: the Internet revolution that we've been waffling on about since the early Nineties is actually happening. But I'm worried that the revolution is, at heart, one of economics, with the Internet merely the enabling technology. It feels like big business has been waiting in the wings, ready to pounce on the web and permanently hijack the thing for its own predictable agenda.

I hope I'm wrong – perhaps the Arctic cold has affected me more than I thought. But I think some radical action needs to be taken to keep the free spirit of the web from sinking without trace.

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letters

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TAXANTM
TOKYO, JAPAN
You won't regret it.

POOR IMITATION

Flicking through *PCW*, I noticed the number of PC developers jumping on the iMac/G3/G4 bandwagon. It really is the old Wintel philosophy of imitation rather than innovation isn't it? Wait for someone to come up with a brilliant idea, then copy it – badly.



They just don't get it do they? Putting some coloured plastic on a PC doesn't change the fact that what's inside is still a PC running Windows. What really differentiates the Apple Mac from the Windows world is its operating system. It's a wonderfully user-friendly, intuitive interface.

JASON STAINES

LETTER OF THE MONTH

Honesty is the best policy

I recently took out a one-year subscription to *Personal Computer World* and I'm very glad I did. Many of the articles are well beyond my comprehension at the moment, but I do feel more 'involved' in the present technological revolution as a result of reading your magazine.

One of the things I especially like is doing the crossword. The format is excellent in that the relatively easy general knowledge vertical clues at least give a computer novice like myself some chance of getting the harder computer-related horizontal clues – thus helping develop my computer skills. The same could be said in reverse for the real 'nerds' who need to get a bit more of a life.

Nevertheless, it has come to my attention that by subscribing to your magazine I get the answers to the crossword clues about 10 days before the closing date of the competition.

For instance, the closing date for the November issue is 30 October, but the answers appeared in the December issue, which I received on the 20 October. Unfortunately, I have already filled in my answers and changing the wrong 'hot

WILL HEAD replies > *Oops, it seems that even the humble staff at the PCW office are capable of making a mistake sometimes. Mark will be soon be in receipt of a brand new Taxan monitor in reward for his honesty. For his own protection we have decided to withhold his address...*

line' to 'hot link' has resulted in a mess, so I won't be entering this month! I won't make the same mistake next month, but in the interests of fair play I'd be grateful if you could look into this matter.

MARK PRESTON

HEADACHE PILLS NEEDED FOR ADSL ROLL-OUT

All the recent hubbub about BT rolling out ADSL gave me a joyful tingle at the possibility of Internet access at the speeds I grew accustomed to in university. However, having given the matter some thought, what a nightmare! Hackers everywhere must be rubbing their hands together with big cheesy grins all over their faces, and network administrators have to be stifling tears from the smarting pain.

Suddenly, all those computers that were given a unique IP address every time they connected to the Internet, will have a permanent address. No more endless searching for the hacker.

All the employees who log onto the network – sailing through a firewall so carefully erected by the administrator, without knowing what it is or what it does – become a potential 'back door' into the system, as long as their computer is switched on.

How secure is an employee's system? The administrator is definitely going to want to know. That is a lot of systems, a lot of security problems and a lot of headaches. I foresee the rate of stress-related disorders among the nation's network administrators taking a major leap in the near future.

M KEATING

STRUGGLING TO MAKE SENSE OF CENSORSHIP

January's *Out of Site* column [about children accessing porn on the Internet] was a good thought-provoking article, but I think you have missed the point.

The providers of these adult sites are not doing it as a free public service that is being frustrated by censorship.

They are doing it to make MONEY from your credit card. The walls would not come down if censorship went away.

ROGER TRUMP

Nik Rawlinson replies > Err, that was my point...

EASYPC IS NOT AS EASY AS YOU MAKE OUT

I found Nik Rawlinson's article on the 'EasyPC Initiative' interesting (*Head to Head*, January 2000). However, I feel he has missed out some vital points.

Firstly, I think that these days the most common upgrade is the processor or memory, rather than hard disks. Would we have to send our 'sealed PC' away every year to run the latest software, or buy a new one? Programs and games will always get bigger and better, and periodic processor/memory upgrades will be needed, unless the EasyPC is to be little more than a set-top box.

Secondly, the idea of relying on a web server or someone else's computer for all of your data, without possessing any backup whatsoever, is absurd. Taking away removable storage also removes confidence in knowing your data is truly secure. If, as Nik suggests: 'We should never need to transport our data on a physical medium again', and it got lost, we'd be in serious trouble.

The 'home network' will be no more secure either. You could store files on every PC in the house, but a virus or malicious hacker can easily wipe .doc files across the network. The audience that 'sealed PCs' are targeting will know very little about file permissions or configuring a firewall. Also, what happens if you lose your ADSL connection, or move to a place without one?

Thirdly, although the space taken up by a PC can be reduced by removing the drives, Nik forgot to mention you'll need extra space for the Device Bay and, of course, an extra power socket. Also, most hi-fis, DVD players, VCRs, digital cameras, digital set-top boxes, and CD players don't



have a 1394 FireWire port, so there wouldn't be a great advantage in moving the PC to the living room, unless you spent nearly £1,000 replacing other equipment. Of course, this excludes the cost of replacing scanners, printers, etc. Since most devices have common audio connectors, doesn't this make the EasyPC proprietary?

The EasyPC Initiative will only make PCs easier to connect, not easier to use. I can only conclude that many potential buyers will be more suited to using a set-top-box for email and web-browsing which, by that time, everyone will have one way or another.

A BUTLER

Nik Rawlinson replies > *The first EasyPC-compliant machines are now among us and initial evidence implies that they are as easy to upgrade as their desktop counterparts, with processor and memory both easily accessible. Of course, this means that they are far from genuine 'sealed boxes', and in general this had been more of a term coined to describe the form factor than a literal description of what they are.*

I agree that the idea of storing all your data on a remote computer is an unwise one, but that is not what was implied in the original article. Your data would be stored on your own local hard drive and any backups could be ported to an off-site location, giving you valuable protection against fire and theft. Many organisations are already using this kind of service. Also, although Device Bay is a viable option

and could easily be integrated into an EasyPC, it is by no means the only one open to manufacturers – those wanting to create a truly toaster-sized device are actually sticking to regular 'notebook' components instead, so space problems are less of an issue.

Again, you are correct in pointing out that the article in question talks about having nice-looking PCs in the living room, but the suggestion was not that because your PC looks nice it should be moved there. The point was more that because a large number of people have no choice but to have it there, they would welcome a more attractive casing. You may, however, be right that for most people a set-top box would be more suitable, but unless the industry at least tries the EasyPC option we can never know for sure. Check out our review of the UK's first EasyPC-compliant machine on p76 this month.

LINUX WILL REWARD YOUR EFFORTS

I read with interest last month's letter, 'No Truck with Linux'. I have been a dedicated Linux user for a while and have read lots of similar letters in the IT press.

People seem to try Linux once and if it doesn't work they give up. I admit the operating system is perhaps not as near to a desktop system as some would like to think. The main problem is that it's not as 'user friendly' to set up as other OSs. I tried three Linux distributions before settling on RedHat's offering, but I stuck with it and now have a more stable OS than Windows9x. It also runs faster on old hardware – my Linux setup is running

on an IBM 330-P75, 32MB of RAM, 100MHz Pentium processor, S3 Trio 32 graphics card and an 8bit SoundBlaster sound card. I also run a combined GNOME and KDE desktop environment to gain the best from both systems.

If people persevered with the system they might be pleasantly surprised. There is enough information on the web and newsgroups to help people out. Failing that you can always pick up a book on Linux, most of them come with the complete OS on a CD. My advice is to find the distribution that suits you before buying it, always go for the latest

version and once you start do not give up. I'm sure when Windows first came out it was subjected to similar negative comments and now look where it is.

PAUL MILLAR

CLARIFICATION:

● The Orange Videophone featured in last month's gadgets is manufactured by Orange, not Nokia. It will retail for around £500 and will be available in the spring/summer of 2000. For further information contact Orange on: 0800 801080

Daydream receiver

The calls are expensive but satellite technology means that Iridium phones can now connect you to the rest of the world no matter where you might be. This is the first fully working example we have seen, and it's available now. So, if you're planning next summer's expedition up the Amazon, put it on your packing list now.

For more details see our reviews section

Price £1,645 (£1,400 ex VAT)

Contact Kyocera 0118 923 0789

www.kyocera.co.uk



The future is sealed

The PC is dead. Long live the EasyPC. It's been a long time coming, but finally PCW has seen the first EasyPC (see our sneak preview in the reviews section). All legacy components have been stripped out so it's a sleeker, more attractive little box than the beige beast on your desktop. Some see this as the way of the future, so expect to see more soon.

Price £899 (£765.11 ex VAT)

Contact AST 01628 521 111 www.ast.com



Work, press and play

The latest addition to Hewlett-Packard's ever expanding range of handheld PCs comes in the form of the Jornada 430. Looking very similar to previous versions, it once again sports a colour screen and quick-access buttons on the front for the most commonly used applications. A new built-in MP3 player makes it an entertainment device, too.

Price £399 (£339.57 ex VAT)

Contact Hewlett-Packard 0990 474 747

www.hp.com



Compaq-t

Projectors were once large and unwieldy, and certainly no fun to carry around from presentation to presentation, especially if you were using public transport. They were boxy, noisy and pretty ugly to boot, but no more. This relatively tiny unit from Compaq rewrites the rule book as far as projectors are concerned.

Price £3,869.28 (£3,293 ex VAT)

Contact Compaq Recommended Resellers 0845 270 4000

The super-waif model

No logos, no buttons, and as slim as a limp sandwich, the Danish designed Mermaid Ventura has to be one of the most stylish 17in flat panel displays going. Its native resolution of 1,280 x 1,024 will suit a huge Windows desktop, and the stand that hides a hydraulic height adjustment strut also houses a couple of speakers.

Price £3,200 (£2,723.40 ex VAT)

Contact Ideal Hardware 020 886 5000 www.mermaid.dk



Cyber-optics

You can buy webcams by the bucket-load these days, but this one has some great software for taking time-lapse photos at set intervals throughout the day, and its swivelling base lets you get a good angle on the action no matter where it's taking place. It's got a maximum interpolated resolution of 800 x 600, and at this price is quite a bargain.

Price £79.99 (£68.08 ex VAT)

Contact ACCO 01296 397 444
www.kensington.com



Views with room

While Kodak's latest digital camera may have a retro feel, the technology inside is anything but old-fashioned. Interpolation takes its maximum resolution up to a whopping 3.3 megapixels. It also comes with a roomy 20MB CompactFlash card, which is more than enough to hold up to 300 images. We give you the bigger picture in the reviews section.

Price £800 (£681 ex VAT)

Contact Kodak 0870 243 0270
www.kodak.com



Game on

For gamers on the go, it looks like the NeoGeo is going to take off in a big way. Not only is it your regular (although impressive) handheld games console, but it can also connect to other NeoGeos for head-to-head gaming and even talk to the Dreamcast for the ultimate games experience. Check out the full review in this month's games section.

Price £59.99 (£51.06 ex VAT) (Games £24.99)

Contact SNK 020 8371 9911 www.neogeopocket.co.uk



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Nik Rawlinson
DEPUTY EDITOR

Nik Lite and speed freaks

It was perhaps not the glitziest launch of the year, but there was only one event that managed to attract the attendance of the entire PCW team last month – the launch of Nik Lite Millennium Edition. It was the result of over 12 months of intense development and involved the manipulation of almost 2GB of code but by the end of the event it was universally agreed that the new improved upgrade was worth the effort and was a vast improvement over version one.

Of course, Nik Lite is not an application but simply the result of half a day spent cleaning up a badly neglected hard drive. A year of installing and uninstalling five or more software packages a week had taken its toll on my poor PC's resources and now it was fragmented,

cluttered and slow. A daily 'You have run out of space on drive C' message and a Windows directory that had bloated to the size of a zeppelin finally convinced me that something had to be done.

There were a number of options open to me but in the end I opted for backing up any vital documents and data, deleting as many useless looking directories and applications as I could find and then biting the bullet by throwing a deltree command into the Windows directory and taking cover.

Testimony to the fact that it was poorly organised and crammed with tiny, fragmented files, is that it churned for over 20 minutes before returning control to the command prompt, but it set me thinking. I reckon that 95 times out of a hundred I use the recommended uninstall routine supplied with software I install, so why should my drive be such a mess? There are a number of factors that could explain the size, but a huge number of undoubtedly redundant system files is more often than not the result of an unclean uninstall.

But when was the last time you asked

how easy it was to uninstall software? We all ask questions about how easy a package is to set up and install, but how many of us spare a moment to think about what will happen when it reaches the end of its useful life and we're after a quick way of dispatching it to the software graveyard? Perhaps we put it to the back of our minds because we don't like to imagine that the package for which we have just shelled out several hundred pounds will not last forever.

Perhaps what we should be asking, though, is why it does not. If it works today it's going to work just as well 10 years down the line. The only difference is that newer software will do it better and faster and it is, like it or not, the 'better

faster' maxim that drives the IT industry. Sometimes it is justified – you'd never dream of trawling the

It is, like it or not, the 'better faster' maxim that drives the industry

Internet on a 9,600bps modem now that the web is more than just text and links – but in most cases you'll rarely find yourself using the latest gizmos of the resource-hungry 'better faster' apps you'll be installing next month.

If this is making me sound like a luddite then perhaps that's what I am. I'm all for an easy life, and I couldn't imagine writing anything without Links, the Office 2000 cat watching over my every move, even if most of my prose seems to reduce it to a lazy slumber within three paragraphs, but sometimes it feels as though the world of computing has bastardised the phrase 'what you've never had you'll never miss' and rewritten it as 'when you get what you've never had you'll realise what your PC is missing'.

So my message is simple. If you want to save yourself a bloated Windows directory and an afternoon spent with your system disks in one hand and a pile of Zip backups by your side, stick with what you've got until you're sure you really do need that upgrade to the 'fastest best yet'.

NIK_RAWLINSON@VNU.CO.UK



**VNU
European
Labs**

VNU Labs tests all kinds of hardware and software, from PCs and modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 98 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

AST Century City

The first offering from the **sealed-box brigade** looks good, but may not be the sale of the century.

At last, the first 'EasyPC' compliant computer has hit the UK consumer market. This next generation of machines builds upon the PC99 standard by stripping out even more legacy components than before, producing a smaller, more attractive box.

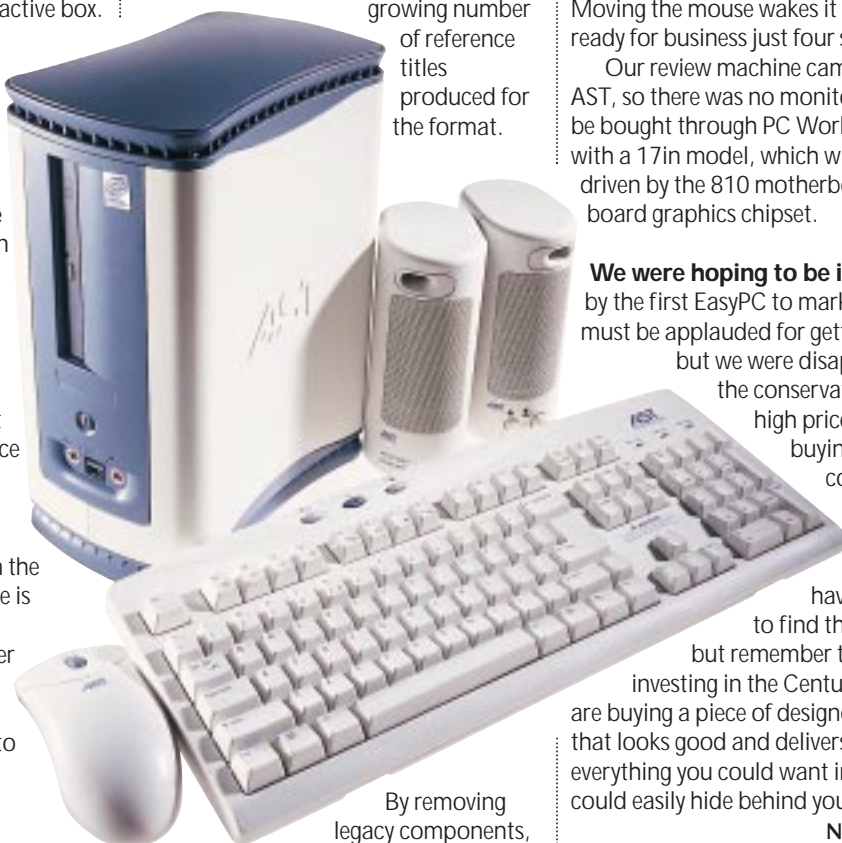
The first thing you notice about the Century City is the lack of a floppy drive. AST cannot be criticised – indeed, it should be congratulated for the move as it is a necessary action for assuring compliance with the EasyPC standard. Even so, it is worth bearing its absence in mind if you are thinking of making a purchase. If you're not happy to share your files solely across the Internet or some form of direct connection you'll have no choice but to shell out for some external storage.

Fortunately, USB is in abundance. With two ports on the front and two on the back there is plenty of room for Zip drives, scanners, web cams or whatever you have in mind, and if you're wondering how your web cam will get its images onto the Internet, there's a built-in Lucent WinModem.

The type of people to whom this first batch of EasyPC machines is likely to appeal will be unlikely to want to take a look at the insides, which is a shame. Once the plastic outer casing has been removed a single screw can be loosened, freeing the whole of the right-hand side to hinge down onto the desk, just like a tiny G4 Mac. You can even do this while it's still turned on.

What you find inside is actually very little: no PCI or ISA slots, and just a single free memory slot. The processor is a 500MHz Celeron, which is fair enough, but it's a shame AST has skimped in other areas, especially considering the price. There's a mere 64MB of RAM and the hard drive runs to only 8.4GB. In an

EasyPC machine there's no room for a second hard drive, so you'll have to replace it altogether if it starts to feel cramped. The only removable media drive is a CD-ROM, but we would have liked to see DVD in there to access the growing number of reference titles produced for the format.



By removing legacy components, AST has managed to

shrink the power supply to just 85W, reducing the need for cooling and hence producing a markedly less noisy machine. The PC's footprint is considerably smaller, too, taking up no more space than a decent-sized toaster.

Complete shutdown and power-off was done in just five seconds

One of the earliest promises of the EasyPC

standard was faster boot and shutdown times. We put this to the test. A complete shutdown and power-off was done in just five seconds – impressive indeed. A regular cold boot was completed in 89 seconds, making it comparable to an average standalone desktop with a fairly clean, defragged hard drive. After we had invoked the

'quick boot' option in the BIOS this was cut to 76 seconds, which equates to a reduction of around 15 per cent. The real bonus, though, is sleep mode, which will suspend the system state and cut the power within a couple of seconds. Moving the mouse wakes it up and it's ready for business just four seconds later.

Our review machine came direct from AST, so there was no monitor, but it can be bought through PC World, bundled with a 17in model, which will in turn be driven by the 810 motherboard's on-board graphics chipset.

We were hoping to be impressed by the first EasyPC to market, and AST must be applauded for getting it there, but we were disappointed by the conservative spec and high price. If you were buying the same components in a regular case you wouldn't have to try hard to find them cheaper, but remember that by investing in the Century City you are buying a piece of designer technology that looks good and delivers almost everything you could want in a box that could easily hide behind your monitor.

NIK RAWLINSON

PCW DETAILS



Price £899 (£765.11 ex VAT)

Contact AST 01628 521 111

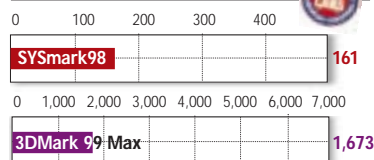
www.ast.com

Good points *Tiny, attractive, USB everywhere, sleep mode is a real time saver*

Bad points *Memory and hard drive are a little cramped*

Conclusion *Tomorrow's technology today, but tomorrow's prices will probably be lower*

PERFORMANCE RESULTS



Fujitsu Siemens Celsius

A mobile workstation to set your temperature rising.

This is probably the first time you've seen the names Fujitsu and Siemens on the same product: the two companies announced an alliance at the beginning of October 1999, and the Celsius mobile workstation is the first fruit of the union.

The Celsius is an unusual beast, aimed squarely at the professional client who needs a portable CAD and 3D-graphics workstation. Its main credential for the role is its graphics chipset, a custom-designed affair called the Celsius GM1. By desktop PC standards the chipset is fairly modest: 8MB, running over an AGP 2x interface with hardware OpenGL acceleration. For a notebook it's unique, and gives the machine a considerable leg-up for those running any OpenGL accelerated application.

The unusual features don't stop there. The unit we looked at sits at the top of a trio of Celsius models, and packs no less than 512MB of RAM. The keyboard is the detachable variety that debuted on Siemens' Scenic Mobiles a while ago: it unclips from the main unit and communicates via an infrared link. The communication is two-way, with the keyboard's integral LCD display continuing to show the main battery's state of charge, disk activity and so on. It's a tad flimsy when detached, but works perfectly and the feel of the keys is excellent, with good tactile response.

With the keyboard detached a smartcard slot on the top surface of the main unit is revealed. Activate the SICRYPT security feature, insert a smartcard and program it with a PIN, and there's no way to access the machine or its data without the card and PIN. This includes attempts to access the data by physically removing the drive.

The Celsius contains a mobile Pentium II/400, complete with 256KB of full-speed L2 cache, a 10GB IBM hard drive, and is topped off by a 1,024 x 768 TFT screen. There are two removable device bays at the front, but you're spoilt for choice, since four devices are supplied as standard: lithium ion battery, two-speed DVD-ROM drive, mobile Zip drive and floppy drive. The battery managed to

power the unit for just over three hours with all power management turned off. Despite the fact that it comes with NT4 Workstation, the Celsius has full power management facilities, including auto switch-off at shutdown. But it doesn't have USB support, so you'll have to wait for Windows 2000 to make use of the single connector.

Silver notebooks were one of 1999's biggest vogues, and the Celsius won't

disappoint anyone in this department, being clad in magnesium alloy. At 3.8Kg, it's no lightweight, but this is a mobile workstation, not a sub-notebook.

As Fujitsu Siemens is well aware, the GM1 chipset gives it a considerable advantage over the opposition for its target market, but it's strange that it sports only 8MB of SGRAM. With the extra memory overhead of double buffering and the Z-buffer for depth information, OpenGL apps are limited to a maximum of 1,024 x 768 at 16bit colour: fine when using the TFT but not so hot when the unit's hooked up to an external monitor. CAD means high resolutions – if the company really wants to impress it needs to make a variant with 32MB of video RAM and a 1,280 x 1,024 TFT.

The chipset also lacks the ability to do hardware fogging and alpha blending. Fujitsu Siemens claims these are hardly ever used in 3D applications, but it's not exactly unknown for 3D visualisation apps to use fogging as a depth cue. Given its size, it also seems odd not to have a



built-in network adaptor.

You'll know if you're a customer who needs a Celsius. By its very nature it's not right for many users. Nonetheless, it's a high-quality, well-focused product that means business.

DAVID FEARON

PCW DETAILS

★★★★★

Price £6,020 (£5,123 ex VAT)

Contact Fujitsu Siemens 01252 555 300
www.siemens.de

Good points Custom OpenGL graphics, data security, half a gigabyte of RAM

Bad points Graphics nothing special by desktop standards, no network adaptor, predictably expensive

Conclusion A brave product that deserves recognition, but it's not everyone's cup of tea

PERFORMANCE RESULTS



Gateway Profile 2

Innovative design and respectable performance, a PC that fits in anywhere space is at a premium.

There's a rash of smaller form factor PCs on the market. Most of them are destined to sit on corporate desks due to their high price tags, but Gateway has a compact PC that won't break the bank.

The Profile 2 measures approximately 455 x 390 x 240mm. Gateway has managed to keep the size to a minimum by opting for a 15in TFT flat-panel display, rather than the usual bulky CRT variety, but the real space-saving feature is that it has squeezed the computer itself into the screen's stand.

You might assume that such a small computer



would be underpowered, but the Profile's specification, while far from the most powerful you can find, is plenty to run all but the most demanding applications. It is built around a 466MHz Celeron processor, plus 64MB of RAM and a generous 13GB hard disk drive that should meet most users' storage demands.

It has to be said that this approach to PC building has its drawbacks, as the Profile is essentially a 'sealed box' and we could find no way to access its internal workings even after we had undone all the screws we could find. So if it's important to you to keep your computer at the cutting edge by adding in the latest graphics cards, for example, perhaps the Profile is not for you.

All the components that go into the PC are built onto the motherboard, which is how Gateway has managed to fit a fully-featured computer into less space than a cereal box. But a SYSmark score of 160 proves its small stature isn't matched by slow performance.

On the flipside, it provides you with everything you will need with a quad-speed DVD-ROM drive, plus DVD movie playback software and an on-board 56K modem. However, we would sound a note of caution if you are planning to use the Profile to watch movies – a 15in TFT screen may not be the best medium. This is not, however, to detract from the quality of this particular screen, which is bright and clear, with a wide viewing angle, so it would be a pleasure to work at, even if it cannot do full justice to DVDs and games. And by its very nature it is part of what makes the Profile so slimline.

For less experienced users there is another advantage of opting for a PC that cannot easily be upgraded. Most computer problems are caused by novice users opening up their PCs and fiddling around inside. With the Profile there is no chance of this, so your computer should run faultlessly out of the box.

If expansion is important to you all is

not lost as there are three free USB ports, aside from the one taken up by the keyboard – the mouse attaches to this via a USB port on the keyboard. Indeed the full-size keyboard is the bulkiest component in this PC, taking up more desk space than the screen and machine.

Gateway has fitted the computer itself into the screen's stand

Upgrade addicts aren't the only ones who may be disappointed by the Profile; dedicated

gamers would also be advised to steer clear. The on-board 4MB Intel 810 graphics chipset isn't up to the 3D graphics necessary to play the latest titles so we couldn't run our usual 3DMark graphics test. But 2D performance is not a problem, so if you can sacrifice that extra dimension then graphics are fine and it managed 23.5fps at a resolution of 1,024 x 768 in our Quake 2 test.

Sound is another matter. There are built-in speakers and a headphone jack, but pump up the volume and you'll suffer tinny audio quality, with virtually no bass provided by the on-board SoundMAX sound card.

Gateway hasn't skimped on software, as the Profile comes with all that you need to get started, including a copy of Microsoft Works and everything you need to get onto the Internet.

URSULA TOLAINI

PCW DETAILS



Price £1,526 (£1,299 ex VAT)

Contact Gateway 0800 552000

www.gw2k.co.uk

Good points Small form factor, good performance

Bad points Limited upgradability, poor 3D graphics

Conclusion If space is the problem, then the Profile 2 is the answer, and for once a small form factor doesn't equal a huge price

PERFORMANCE RESULTS



Sony Vaio PCG-X9

Mobile video editing is a real possibility with Sony's roomy X9.

Right from the start Sony's range of notebooks was geared towards digital video editing. Even the first Vaio had a FireWire or IEEE1394 port. This allowed you to connect a DV camcorder to the notebook and transfer your footage without any degradation in quality. Unfortunately the hard disk constraints of mobile computers were such that it wasn't really viable to use a notebook for video editing unless you desperately needed to do it on the move. But this is about to change

The X9 is the new top of the range notebook aimed at the mobile video editor. There are quite a few new developments but the two most notable are the hard disk and the CPU. The X9 sports a massive 18GB hard disk, making it more than capable of video editing. Of course, even this capacity is small compared to the size of desktop hard disks, but it's more than adequate for the job at hand. The processor is Intel's latest chip, the mobile Pentium III running at 500MHz. Supporting the CPU is a generous 128MB of RAM, keeping the spec as cutting-edge as possible.

Bundled with the machine is Sony's DVgate digital video-editing software, so you really do have everything you need for a mobile video studio.

Even though the X9 targets the digital video editor, it's a very impressive mobile PC as well. As always ergonomics are very important with notebook computers, and both the display and input devices are paramount to the user. The screen on the X9 is a 13.3in affair with a resolution of 1,024 x 768. The lighting is uniform across the entire

surface and Sony has placed a protective cover over it to prevent damage.

The keyboard is one of the best we have seen. The keys are large and well-spaced while the travel and break are spot on. Even typing for extended periods is no problem. Pointer manipulation comes courtesy of a touchpad that exhibits equally impressive performance. The software controlling the touchpad is also comprehensive. As with most notebooks you can switch off the touchpad's tapping ability to stop inadvertent cursor movement while typing. However, Sony has added the option to allow tapping, but only when you're not typing.

On the right-hand side of the keyboard is a jog dial.

When no windows are active a small selector appears in the top right-hand corner of the screen. The jog dial allows you to scroll through multiple options such as launching DVgate or Microsoft Word, while pressing the dial activates your selection.

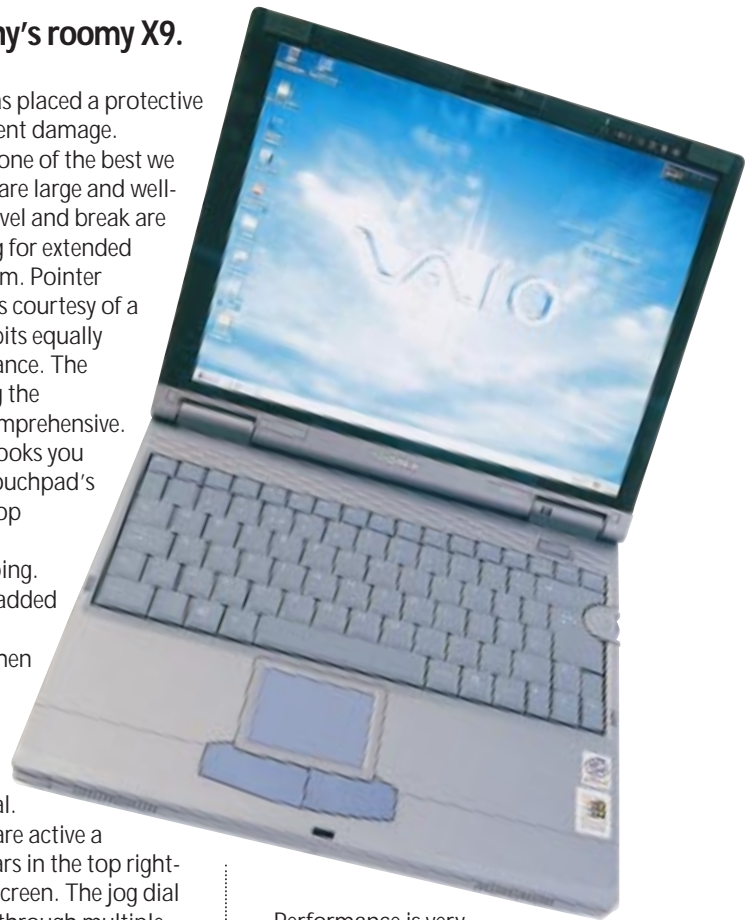
The X9 comes with a DVD-ROM drive as standard, which slots into the single expansion bay. The floppy drive can also be used in this bay or it can be connected externally via the supplied cable.

On the left of the unit is the FireWire port and two PC Card slots, while on the right is the expansion bay and audio ports. At the rear are USB, serial and docking bay ports. There is no integrated parallel port, but when the floppy disk cable plugs into the docking station port it also provides a parallel port.

Included in the box is a docking bar with a host of extra connectivity. The bar gives you two USB, one serial, one parallel, line in and out, VGA, composite video, S-Video, PS/2, FireWire and most impressively, optical digital out.

Rounding the package off is a 56K PC Card modem for Internet connectivity.

On the whole the only thing missing is a carrying case, although you do get a nifty little case for holding the peripherals.



Performance is very impressive with a SYSmark score of 199 – on a par with a 500MHz Pentium III desktop. That said, it's only two points faster than the 450MHz Hi-Grade PIII notebook we looked at in December.

Ultimately, the X9 is a triumph, it allows serious digital video editing on the move and has all the requirements of a powerful desktop replacement.

RIYAD EMERAN

PCW DETAILS



★★★★★

Price £3,700 (£3,149 ex VAT)

Contact Sony 0990 424 424

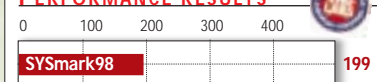
www.sony.co.uk

Good points Very fast and well featured, great bundle

Bad points Expensive

Conclusion At last, a serious solution to mobile digital video editing

PERFORMANCE RESULTS



THE RAISED REAR OFFERS BETTER COOLING FOR THE PIII



Kodak DC290

A premiership camera but not in a league of its own.

The DC290 is the newest camera in Kodak's digital range. Manufacturers in every area of computing need a simple figure to latch onto to convey the superiority of their products, and with digital cameras it is CCD resolution.

The 290's box proudly states that the camera has '3.3 Megapixel Ultra Resolution', but that's only when images are interpolated upward, artificially inflating resolution with no real gain in quality. The actual CCD resolution is 2.3 megapixels, pretty much par for the course at the high end. The highest non-interpolated image resolution you'll get from the 290 is 1,792 x 1,200.

Kodak hasn't demonstrated a great deal of design flair in its digital range, although the 290 is better looking than some of the early models. It's pretty much square when viewed from the front, and the added height makes it comfortable to hold. The unit's lens is an f3-f4.7, 38-115mm equivalent zoom, which again is more or less the standard for higher-end zoom models, but Nikon's Coolpix 700 and 950 will manage f2.6-f4, while Sony's F505K delivers f3.3 at its powerful 190mm telephoto setting.

The 290's image resolution and compression quality settings are separate, so you can choose either 720 x 480, 1,440 x 960 or 1,792 x 1,200 at any of three JPEG compression quality modes, or with lossless TIFF compression. This also applies to the Ultra 2,240 x 1,500 interpolated resolution, with the exception of the TIFF option.

The DC290 sports both optical viewfinder and 2in TFT monitor, with control via the monitor improved over earlier models: there's now a four-way thumb pad *à la* Sony for menu navigation. The thumbnail review mode is better than most, with four thumbnails displayed at a time along the top of the screen and an enlarged thumbnail of the current picture in the bottom half.

An excellent feature of the DC290 is its time-lapse mode. You can set the



camera to take up to 1,000 pictures at intervals of between one minute and 24 hours, assuming you have the memory. Once they're taken, you can assemble them into a movie with the AVI generator utility bundled with the unit. There's also a voice recording feature via an integral mic – you can attach annotation to each shot individually, and when the shot is deleted the annotation is deleted too.

The age of 4MB digital cameras has thankfully passed, and the Kodak is supplied with a single 20MB Compact Flash card. This will give you 250-300 pictures at the lowest res, highest compression mode, down to around 30 in high (non-interpolated) resolution with low compression.

This is a high-end consumer camera, not a semi-professional, and operation is largely automatic – there's no aperture or shutter priority mode. Exposure can be nudged by plus or minus two stops, and you can choose from multiple and single-spot auto, or manual focus. There are daylight, fluorescent and tungsten white

balance modes, too, as alternatives to the automatic setting.

Digital camera quality is improving rapidly. The DC290 is no exception, and an image taken with low compression is hard to tell from a print.

The original bugbear of digital cameras was colour divergence – giving a video-esque quality – but this has now been mostly eliminated. CCD artefacts haven't completely disappeared, though,

with discernable noise on uniformly-coloured surfaces, particularly white, in low-light shots without flash. Focus and image sharpness isn't as good as the competition, notably Sony's F505K – edges tend to be soft.

The DC290 has some very neat features, and image quality is unlikely to leave you disappointed. Overall, though, Sony has stolen the march on this area of the market for now.

DAVID FEARON

PCW DETAILS

★★★★★

Price £800 (€681ex VAT)

Contact Kodak 0870 243 0270
www.kodak.com

Good points Fine image quality, lots of features, 20MB memory

Bad points Almost everything it does is done better by Sony

Conclusion A good high-end consumer camera, but at the risk of repeating ourselves, Sony's F505K simply outclasses it, although the Kodak does have considerably more memory supplied as standard

NEC MultiSync FE700 and Hansol 710P

Cheap and cheerful **quality monitors** that won't disappoint.

The latest addition to NEC's range, the MultiSync FE700, sports a flat 17in CRT (16in viewable diagonal) that we found comfortable to use at a respectable 1,152 x 864 with no discernable flicker.

What, in fact, you get for your money is one of the most affordable aperture grille displays on the market. There was practically no reflection and it has a well organised and extensive OSD with degauss, image rotation and five pre-set colour temperatures ranging from 7,500K to 9,300K, that are supplemented by a user-defined setting. Trapezium adjustment is a little confusingly called 'align'.

The monitor suffered from slightly uneven luminance at the far right and left-hand edges, but this was otherwise uniform on the vertical



THE FOCUS ON NEC'S MULTISYNC WAS SHARP AT THE EDGES

plane. Upon arrival there was also slight evidence of pincushion distortion, although this was easily eliminated through the on-screen menu, which also helped it to achieve perfect geometry, even in the corners, where squares really did look like squares and not rectangles.

There was no lack of focus when we compared bright white and darker grey characters and no discernable loss of focus when comparing the traditionally sharper centre of the display with that at the edge.

On the other hand, there was slight moiré on two of our test patterns and both horizontal and vertical colour registration were slightly misaligned, although in everyday use this is not something you would be likely to notice. Screen regulation was very poor, and when we applied a flashing white block to an otherwise black screen it expanded dramatically.

Hansol has hit a similar price point with its 17in (16in viewable diagonal) 710P. It's not far off being flat, unless you compare it directly with the NEC, but instead of opting for aperture grille you get the less exciting shadow mask.

Both NEC and Hansol opted for a captive signal cable, so any problem with this means replacing the whole monitor. Like the NEC, the 710P suffers from practically no reflection and is pleasant to use for long periods.

The OSD is extensive and easy to navigate but falls short of the NEC in terms of colour temperature presets: it has two factory settings, supplemented by a user-defined option, which is not as easy to set as that on the NEC.

Screen uniformity was good on both the horizontal and vertical planes, so there were no undesirable brighter stripes along the edges. Upon arrival there was slight trapezoid distortion to the image displayed, but this was easily rectified through the OSD.

Geometry was spot on – fine lines were crisp, corners were sharp and lines that should have been straight were. Unfortunately, there was slight blooming when bright white characters were compared with the same in dark grey.

Focus was uniform across the whole surface of the display, even in the hard to reach corners but, like the NEC, it suffered from slight moiré, even after degaussing, and had very poor screen regulation. Again, both horizontal and vertical colour registration were slightly out of line.



HANSOL'S 710P HAS THE EDGE OVER NEC'S MONITOR

At these prices there is no longer an excuse to settle for anything less than a

17in display, or for PC manufacturers to consider bundling anything smaller. NEC impressed us by delivering a Natural Flat Diamondtron display for less than £200, which we hope is a sign for the future. These have traditionally been the *crème de la crème* in the monitor world so it's good to see them being made available to users on a lower budget.

With its 710P, though, Hansol has proved that technology is not everything and, putting aside the fact that aperture grille displays are brighter because of their unbroken strips of phosphor and often display a much purer colour, it has the slight upper hand here with a marginally sharper contrast and slightly lower price.

NIK RAWLINSON

PCW DETAILS



NEC MULTISYNC FE700
Price £199 (£169.36 ex VAT)
Contact NEC 0645 404020
www.screengods.co.uk



HANSOL 710P
Price £186.83 (£159 ex VAT)
Contact Hansol 01252 360400
www.hansol-uk.com



SB Live! Platinum

Plug straight in to **your PC studio**, and play.

Creative Labs has been at the forefront of PC audio since its inception, and in many ways it's been a bit of a one-horse race. With each new generation of SoundBlaster card the competition is left wondering how to copy it. This time, however, Creative has outdone itself.

The SoundBlaster Live! Platinum is exactly what every budding PC musician has been asking for. Creative has obviously been listening to its customers, because there isn't a single thing missing.

In the box you get the latest generation of the SoundBlaster Live! card, which is a seriously good addition to any PC. The usual array of digital and wavetable effects are present, but that's not what makes the package special. Also in the box is the Live! Drive II. This little beauty slips into a free 5.25in drive bay and features an array of connections that turn your PC into a studio.

Integrated into the Live! Drive you'll

find optical digital in and out, coaxial digital in and out, analog in and out, Midi in and out and headphone and microphone jacks.

With the Live! Drive II in your machine it's never been easier to import or export digital data to DAT or MiniDisc.

The story doesn't end there though. As well as the full complement of SoundBlaster applications and tools, there's also a copy of Cubasis VST in the box, so you can start sequencing straight away. Plus, if you're into games, load up the bundled Aliens V Predator – but make sure you keep the lights on.

Making it a truly great retail package, Creative also throws in a microphone, both digital and analog CD-Audio cables and even screws to fix the Live! Drive II.

The SoundBlaster Live! Platinum is



the best PC sound product ever, it really is that simple. And if you take the incredibly low street price of £125 ex VAT into account, it's an essential purchase.

RIYAD EMERAN

PCW DETAILS

★★★★★

Price £146.87 (£125 ex VAT)

Contact Creative Labs
01189 344 744

www.europe.creative.com

Good points Live! Bay and bundled extras

Bad points None

Conclusion Best PC sound product ever



Matrox Marvel G400-TV

A bundle of tricks that **ups the ante** of your 3D performance and lets you watch it all on TV.

Marvel is an understatement given the level of functionality Matrox has crammed into the G400-TV. Building on the success of the Marvel G200, this card proves that you can have the best of both worlds – the bells and whistles of a TV-enabled card combined with lightning-fast graphics performance.

To see how well it performed in the graphics stakes, we put the Marvel up against its big brother the Millennium G400 Max. The Marvel fared well, notching up 4,425 3DMarks as opposed to 4,516 for the Max at the standard resolution of 1,024 x 768 in 16bit colour.

Moving onto the video-editing front you'll find the features of the Marvel hard to match for the price. The card itself is a standard size AGP affair with 16MB of

SGRAM, that attaches to a blue break-out box (BOB). The BOB includes the TV Tuner as well as input and output connectors for composite and S-Video, allowing you to place the box on your desk for easy access to the ports.

Using Matrox's dual-head technology, Marvel can output a separate image to a TV, enlarging the Windows desktop or providing full-screen DVD playback, without reducing the refresh rate of the primary monitor. In addition, the card can capture video in real time using a hardware MJPEG codec, that provides quality video at a decent frame rate and allows for frame accurate video editing. The resulting AVI can be converted to an MPEG2 movie.

To make use of all this, you'll find a copy of Avid Cinema video-

editing package, Matrox DVD player, PhotoExpress image editing, PC-VCR to control the tuner, LSX MPEG2 transcoder, and a couple of games

WILL HEAD

PCW DETAILS

★★★★★

Price £257.33 (£219 ex VAT)

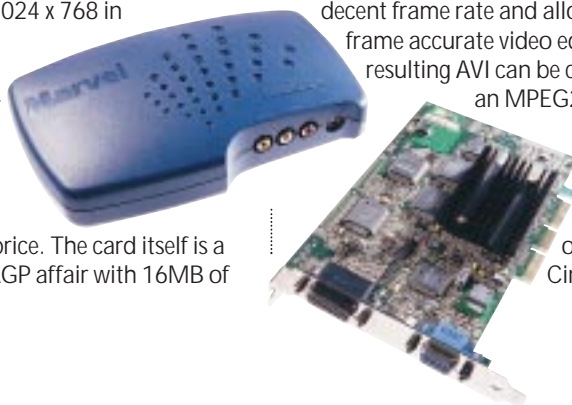
Contact Matrox 01753 665 500

www.matrox.com

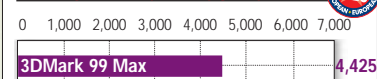
Good points Dual head, hardware MJPEG capture, good graphics performance, TV Tuner, software bundle

Bad points You can only use the dual head with a TV, not a second monitor

Conclusion If you're into video editing, but don't want to sacrifice 3D performance, the Marvel G400-TV is a win-win solution



PERFORMANCE RESULTS



Kodak DC240i

Even digital cameras are **Mac-ophiles** these days.

The DC240i is another product redesigned to appeal to iMac users. The original Kodak DC240, released a year ago, has been given translucent plastic covers in a range of colours: blueberry, tangerine, lime, strawberry and grape.

Back when it was released, the DC240 was a top of the range megapixel camera. A year on it is mid-range with its 1,280 x 960 resolution. It has the same

lens as the DC240, equivalent to a 37-119mm lens on a 35mm camera which gives 3x optical zoom backed by a 2x digital zoom should you wish to use it. The camera comes with an 8MB CompactFlash card, that will store 21 pictures at the highest resolution and 56 pictures taken at 640 x 480.

The menu options on the DC240i are obviously aimed at the amateur user. Among the first are those for adding borders and effects, such as black and white or sepia tones, to your pictures. However, there are exposure and white balance settings for you to play with.

To use the camera with USB on an iMac, you will have to be running Mac OS 8.5 and on a PC it has to be Windows 98, although serial interfaces are included for use with older OS



versions. PC users get a raw deal on the software bundle: Adobe PhotoShop 1 for the PC, while Mac users get version 2, although both Mac and PC users also get Adobe PageMill 3. Downloading pictures into any TWAIN-compliant application is easy enough using the bundled USB connector and camera drivers.

The DC240i handles colour well, producing bright images with well-rounded and rich tones. However, it deals less well with surfaces that reflect a lot of light, leaving images looking a bit over-exposed.

ADELE DYER

PCW DETAILS



Price £449.99 (£382.97 ex VAT)

Contact Kodak 0870 243 0270
www.kodak.com

Good points Easy to use.

Bad points Poor deal for PC users on the software bundle. Images occasionally overexposed

Conclusion A good little camera, but there are better options for the price

OnStream SC50

Affordable **tape storage drives** have arrived.

Tape is a natural choice for data backup as it provides a good balance of performance and low storage costs. However, what is irritating is that most high-capacity tape drives cost substantially more than the hard disks they are protecting. OnStream is set to break the mould as its SC50 offers 50GB of compressed storage on a single tape and yet costs far less than the competition.

Only available with a SCSI interface, the SC50 uses a multi-channel head to record data on eight tracks simultaneously and employs an embedded servo mechanism to keep the head positioned correctly in the event of tape wander. Each tape has special servo tracks that are also used to identify defective areas as the drive will stop writing if it can't read both tracks.

OnStream includes Echo backup software and a 60-day evaluation of Veritas Backup Exec. Aimed at workstation backup, Echo assigns a drive

letter to the SC50 so you can use drag-and-drop operations for copying and restoring data. However, you can't use any other backup software alongside Echo because it loads a background task that requires exclusive access.

For testing, the SC50 was installed on a Dell PowerEdge 2300 server with dual PIII 400MHz processors and running Windows NT Server 4. Using the supplied copy of Backup Exec, the SC50 secured 3.2GB in only 36 minutes at an average of 93MB/min. Full tape to hard disk verification was slightly faster at 105MB/min while a restoration of 2GB of data took 22 minutes at an average of 100MB/min.

Clearly, OnStream is offering a superb backup solution that is ideal for



high-end workstations and servers alike and the combination of speed, capacity and price is unbeatable.

DAVE MITCHELL

PCW DETAILS



Price £586.32 (£499 ex VAT)

Tapes £43.42 (£36.95 ex VAT)

Contact OnStream
0800 328 1204
www.onstream.com

Good points Good performance, high capacity and very low costs

Bad points Echo software requires exclusive access

Conclusion High-capacity backup should not be an expensive luxury and the SC50 ensures that it isn't

Kyocera KI-G100/SD-66K

A mobile phone unit boasting **world coverage**, for adventurers and those who like expensive toys.

Along with the Internet, mobile phones represent one of the biggest growth industries of the past decade. Mobile phone coverage has become so widespread that you're likely to find a GSM signal in almost every town in the world. This is all well and good, but if you're not travelling to a town, or even to an inhabited area, your GSM mobile phone won't do you much good. You could be hiking in the Himalayas or trekking through the Amazon, where mobile phone coverage is definitely needed but sadly lacking. However, there is an answer to this problem and it's called the Iridium network.

Unlike standard mobile phone networks, Iridium doesn't use cells to keep in contact with all its users. Instead, it has a network of 66 satellites that beam the signal to and from its phones. This means that you can use an Iridium phone almost anywhere on the planet, making it ideal for adventurers. Of course the situation isn't perfect. Because you are beaming a signal to a satellite, you need to have line of sight to the sky. This means that an Iridium phone won't work if you're inside a building, unless you can point the aerial out of a window.

One of the first companies to produce a phone using the Iridium standard is Kyocera. The company is more commonly known for making printers, so this is quite a departure. That said, it's done a fine job of implementing this new technology. Although Kyocera produces an Iridium-only phone, we decided to look at its Iridium/GSM combo unit.

This package comprises a KI-G100

GSM mobile phone and an SD-66K Iridium unit. The beauty of this solution is that you can use the GSM phone separately when you are in an area with coverage and then slip it into the Iridium unit when you aren't.

Considering that GSM phones are getting smaller and sexier all the time, Kyocera has done a good job with the KI-G100. It measures 41 x 130 x 25.5mm (w x h x d) and weighs only 105g. It offers

Vegas, you can slip the KI-G100 into the SD-66K unit and use Iridium instead. Once the two units are joined it looks similar to the very early brick-sized mobile phones. Although you can use a specific Iridium SIM card, if you have a Cellnet GSM SIM card in the KI-G100, you can use that to make calls on the Iridium network as well. In use Iridium wasn't perfect. It generally took about 10 dropped calls before a connection was actually made. Once the call was put through, though, the sound quality was every bit as good as a standard GSM call. Although standing on the streets of London or Las Vegas watching call after call being dropped wasn't much

fun, if I was stuck in the jungle and needed help a few dropped calls would be a small price to pay. Call charges vary from the country of origin and range from \$1.18 (72p) to \$2.74 (£1.67) per minute of call time.

The Iridium module comes complete with two lithium ion batteries and a smart little remote vibrating buzzer. This is particularly useful if you've got lots of heavy weather clothing on and you can't hear the phone ringing. If you place the small buzzer near your body, when the phone receives a call it will vibrate to alert you.

On the whole Kyocera has come up with a great product. The market for this type of equipment may not be huge, but if you find yourself out in the wilderness, this is exactly what you need.

RIYAD EMERAN



approximately two hours' talk time and 70 hours' standby. It boasts all the usual mobile phone features and has a useful jog shuttle for scrolling through your address book and options. The phone uses the GSM 900 standard, which gives you coverage in almost every country – with the exception of the US. For some reason the Americans decided to launch their GSM network on the 1900 standard, used by no other country in the world.

If you find yourself without GSM 900 coverage, as I recently did while in Las

PCW DETAILS



Price £1,645 (£1,400 ex VAT)

Contact Kyocera 0118 923 0789

www.kyocera.co.uk

Good points Flexible GSM/Iridium combo, worldwide coverage

Bad points Expensive, niche market

Conclusion A great product that will be a godsend to those who need it and an expensive toy to those who don't

Dreamweaver 3 and Fireworks 3

There is **substance beneath the makeovers** given to two market-leading web-design packages.

Dreamweaver and Fireworks have long been the HTML and web image optimisation editors of choice for professional web designers because of their clean, fuss-free way of working. Many users will wonder what Macromedia could possibly do to either of these products to improve on what they already have. We wondered, too, so put them to the test.

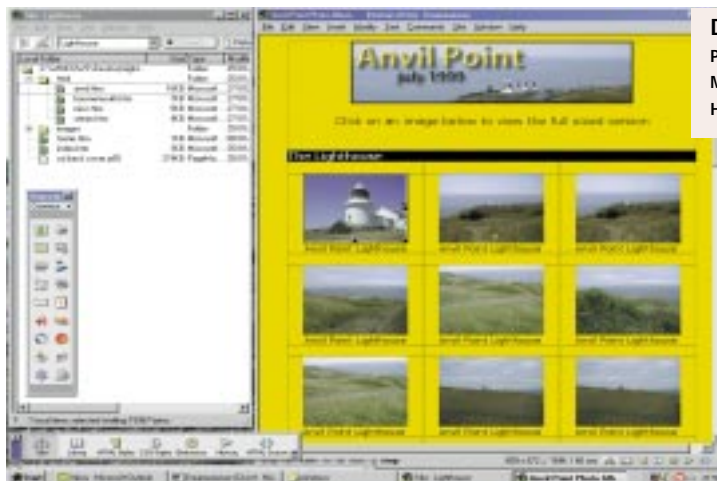
Dreamweaver 3

Dreamweaver 2 has won two *PCW* group tests and we have yet to find anything that comes close to matching its ease of use, compact HTML coding and speedy, simple operation.

On the surface, version 3 looks remarkably familiar. The interface is much the same, but if you look closely you'll see it has been expanded. New sheets have been added to the Objects palette and new buttons on the working window give immediate access to cascading style sheets and the new HTML styles.

There's also a new history palette that allows you to roll back an unlimited number of changes, even back past 'saves'. The history list itself can also be saved and run much like a macro, saving time on future pages. Another time-saving feature is the ability to customise every menu through JavaScript, thereby tailoring the package to meet your exact requirements.

With Microsoft Office making it easy to generate web pages from Word and Excel, the new 'Clean Up Word HTML' function will be welcomed by many. In our tests, it removed multiple Word-specific tags and reduced the size of the resulting file to around 50 per cent of the original. It made one minor alteration to a numbered list, but only to bring it in line with HTML coding conventions, but apart from that the output looked identical and the code was clean.



DREAMWEAVER 3 HAS POSSIBLY THE FASTEST METHOD YET OF CREATING HOT-SPOTS ON A MAP

be kept open without cluttering too much screen real estate, and as users of any of the previous incarnations of Dreamweaver will know, this is a desktop-hungry application. The raw HTML coding window now has an

edit menu attached, making it easy to search, copy, paste and so forth from directly inside the window.

For Dreamweaver 3, Macromedia has developed the idea of HTML styles. Older browsers cannot handle cascading style sheets (CSS) and so, to facilitate speedy formatting, Dreamweaver includes a new palette into which users can save their most commonly used text styles.

Highlighting an area of text and clicking the style on the list applies the necessary HTML tags, drastically cutting the amount of time taken to format complex sections. Hitting CTRL-Y will also now apply the last style to the current piece of text, much like the redo function of a word processor.

Dreamweaver has always made raw-code editing easy with its integrated HTML editor, but this is now supplemented by the 'Quick Tag Editor'. Highlighting any page element, such as an image, and hitting CTRL-T brings up a small window containing just the tag that activates that element. This can be directly edited on the spot, without the need to switch into the code-editing mode. Pausing while you enter a tag will bring up a list of possible tags that match the first few characters entered. The correct tag can then be selected using the mouse.

The full HTML editing window, meanwhile, has been transformed into a tabbed palette that can be dragged around the workspace and docked among other palettes. In this way it can

edit menu attached, making it easy to search, copy, paste and so forth from directly inside the window.

Dreamweaver is also closely tied in with Fireworks. With Adobe now bundling ImageReady 2 with Photoshop 5.5 this is a sensible move as it once again makes Fireworks a viable choice of image editor for the Dreamweaver user. Selecting a graphic for editing in Dreamweaver automatically opens it within Fireworks and the code produced within Fireworks is backwards compatible with Dreamweaver.

With group working in mind, collaborative editing functions are now available. Files can be checked 'in' and 'out' to ensure that you never get more than one person working on a file at any one time.

Image maps can be defined from directly within the property inspector bar, which tailors itself to contain only the fields relevant to the element you are editing at any particular time. Dedicated tools that appear whenever an image is selected allow you to draw the map's hot-spot areas that can then be repositioned using the mouse pointer. This surely has to be the fastest way to create an image map.

It was always going to be difficult for Macromedia to improve on what it had with Dreamweaver 2, but with the addition of HTML styles and the Quick Tag Edit window it seems to have

managed to produce a product worthy of an upgrade.

Fireworks 3

In common with Dreamweaver, Fireworks now has a history palette, allowing you to scroll back your list of actions, even past file saves, and save the entire palette as though it were a macro, saving time if you often carry out the same tasks on multiple images.

A welcome change is that the workspace has been tabbed. What this means is that four sheets lie on top of one another and, by clicking on the appropriate tab, you can flick back and forth between your work, a preview in which any rollover buttons will work, and two-up and four-up previews of your work after 'optimisation' – Macromedia's term for the process of compression or colour reduction necessary to facilitate speedy modern downloads. Additionally, this 'optimisation' encompasses a new lossy GIF option that performs similar functions to JPEG compression before saving in GIF format.

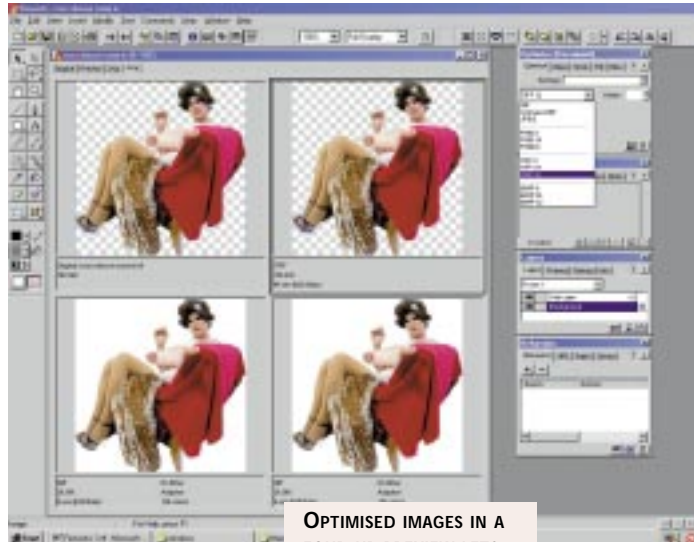
With a tabbed workspace such as this you no longer have to navigate the 'save' dialog before you know what images will look like on the page, so you can now create your masterpiece with even more confidence than users of Fireworks 2.

HTML can now be copied to the clipboard and pasted directly into your web editor of choice and curves have been added for controlling brightness/contrast and hue/saturation levels. There is a new symbol library that allows you to store commonly used objects. The easiest way to think of this is as a versatile, multi-page clipboard. Buttons dropped into the library carry with them all of their associated slices and links.

The accurate placement of image elements is now easier than ever: the align heights function equals the distance between each object in a group, while 'align widths' does the same on a horizontal plane. Selecting the font drop-down menu now simultaneously opens a small window beside the font list. Running the mouse over any of the fonts then displays

the text you have already typed in the highlighted font before you have committed to it – a real time saver.

Text entry and editing still all has to be done through a dialog box, unfortunately, and you cannot yet type directly onto the page and



OPTIMISED IMAGES IN A FOUR-UP PREVIEW LETS YOU EDIT WITH EASE

edit your attributes through a palette

A change we didn't like was the way that adjustment drag bars have been switched from vertical to horizontal operation. Previously, if you had wanted to change the size of a font or the level of quality reduction in a JPEG, you held down on the adjustment slider, which would then pop up a vertical scale. You would then drag your mouse up and down it without moving your finger.

These pop-up sliders now appear below the button you have pressed and you have to move the mouse again before you can start using them, which takes a little getting used to and lacks the fluidity of the original implementation.

The 'effects' palette has been greatly expanded and can now be increased still further through the use of third-party plug-ins. There is no longer a need to distinguish between single and multiple effects as each is

presented on a fly-out menu and added to the list of effects applied to each object one after another, letting you go back and edit any individually applied effect directly without adjusting or undoing the rest.

The package has retained its ability to import Photoshop images, keeping all of

the layers intact, and Fireworks behaviours are now recognised as native Dreamweaver behaviours, buttons in Adobe GoLive or JavaScript rollovers in Microsoft FrontPage. HTML export options run along similar lines, with Dreamweaver, FrontPage, GoLive and 'No HTML' at your disposal.

The whole picture

For both Dreamweaver and Fireworks, it was always going to be difficult to improve on version 2, but the new usability features, global history palettes and Dreamweaver's innovative Quick Tag Editor and HTML styles make either a worthy candidate for those considering an upgrade. If you're looking for an end-to-end integrated solution to web design, you'd not go far wrong

if you bought both packages together.

NIK RAWLINSON

PCW DETAILS



★★★★★

Dreamweaver 3

Price Dreamweaver full product £269.08 (£229 ex VAT), upgrade £116.33 (£99 ex VAT)

★★★★★

Fireworks 3

Price Fireworks full product £163.33 (£139 ex VAT), upgrade £116.33 (£99 ex VAT)

Owners of both Dreamweaver 2 and Fireworks 2 can upgrade to Studio for £175.08 (£149 ex VAT)

Owners of either Dreamweaver 2 or Fireworks 2 can upgrade to Studio for £210.33 (£179 ex VAT)

Contact Computers Unlimited
0181 358 5857

www.macromedia.com

System requirements

Dreamweaver 3: Windows 95, 98 or NT4, 120MHz or faster processor, 32MB RAM, 20MB free hard drive space, 256 colour monitor with a resolution of 800 x 600, CD-ROM drive

Fireworks 3: Pentium processor (Pentium II recommended), Windows 95, 98, or NT (with Service Pack 3) or later, 64MB of available RAM, 640 x 480, 256-colour display (1,024 x 768, millions of colours recommended), 100 MB of free hard disk space, Adobe Type Manager Version 4 or later with Type 1 fonts

Conclusion Upgrade to either or both and you won't be disappointed

You can now create your masterpiece with even more confidence

Microsoft Money 2000

Money's latest attempt to jump ahead of Quicken in the personal finance arena doesn't come cheap.

Microsoft Money and Intuit's Quicken are the two important contenders in the market for personal finance managers, and for the past couple of years they have been roughly neck-and-neck. So, with the release of Money 2000, has Microsoft managed to put any clear blue water between them?

Three editions of Money are now available. As with Money 99, Standard is aimed at home users, while Financial Suite adds greater planning facilities. The new entrant, Personal and Business, is aimed primarily at sole traders. Using Money for the first time is an extremely simple process, with a straightforward setup assistant.

The program is based on a web interface, and is integrated with Internet Explorer 5, which comes on the same CD-ROM. Money's home page – the screen that opens when the program is loaded – has been improved significantly, fitting in more information.

However, for many users, the most commonly visited screen will be the transactions view. As in previous versions, this looks a little like a spreadsheet, displaying each of the transactions for a particular bank account one after another down the page. Entering new transactions can be done either by filling out a form at the bottom of the screen or more directly as you would with a spreadsheet.

The Financial Suite comes with a number of integrated worksheets that, for example, let users create a Will and evaluate the benefits of a company car. Additionally, it offers planning facilities to help the user create and keep to a strategy for paying off loans or saving for school fees.

With the Personal and Business edition, Microsoft has, for the first time, made a serious attempt to attract small-business users to Money. While not offering the sophistication of a program such as QuickBooks, it may be a better



MONEY EXPRESS WARNS ABOUT FORTHCOMING AND OVERDUE BILLS

In addition, Money Express permits simple transactions to be entered without loading Money itself.

The fact that Money 2000 is not a radical improvement suggests that the personal finance management market is beginning to mature. Money 2000 is an excellent product, but we are not sure it

option for sole traders wanting a simple program to track both personal and business finances. It has fair invoicing facilities, although as in previous versions, the lack of an invoice designer is disappointing.

Additionally, Money will produce quotations, credit notes and pro-forma invoices, the latter being something that many of the so-called business accounts packages lack. For the first time, VAT is now tracked, making Money suitable for VAT-registered traders.

It is worth bearing in mind the price. At £69, it is £20 more expensive than Quicken Deluxe, despite offering roughly equivalent business features. Additionally, Quicken Deluxe is bundled with a program for producing self-assessed tax returns, whereas Microsoft's equivalent program will set you back a further £25. For these reasons alone, Quicken may be a better option.

However, if you are likely to want online banking, Money may be the only option. It currently supports eight high-street banks, whereas Quicken only caters for NatWest customers. While bank statements can be downloaded automatically in both packages – saving the time and hassle of entering them manually – only Money has a facility to pay bills automatically.

Of course, remembering to pay bills on time can be a problem, and Money goes a long way to solving this. A bundled utility, Money Express, will warn about forthcoming bills when you switch on the computer, so long as the bill has been entered into Money's bill calendar.



MONEY'S MUCH-IMPROVED HOME PAGE

is worth paying to upgrade (there is £20 cashback for existing users).

For new users, there is not a lot to separate it from Quicken. However, if you are looking for a package for personal use, we would recommend Money, if only because Quicken is way behind in terms of online banking. On the other hand, sole traders wanting to look after small business accounts and calculate their tax will find Quicken Deluxe is better value for money.

ALEX SINGLETON

PCW DETAILS



★★★★★

Price Standard £29.99 (£25.52 ex VAT), Financial Suite £49.99 (£42.54), Personal and Business £69.99 (£59.57)

Contact Microsoft 0345 002 000
www.microsoft.com

System requirements Pentium 90MHz, Win95, 98 or NT4, 16MB RAM (or 24MB for NT4), 70MB disk space (or 175MB if IE5 is not installed).

Good points Ease of use, excellent online banking facilities

Bad points No bundled tax form software, lack of invoice designer

Conclusion Outstanding for the home user, but the sole trader will find Quicken Deluxe better value

Adobe PhotoDeluxe HE 4

Home users who don't need an **industry-standard photo-editing suite**, now don't need to pay for it.

There are times when using Photoshop is overkill. It's unbeatable when it comes to digital photo-editing, but if all you need to do is organise your snaps and the occasional bit of tweaking then you can happily settle for something a lot less powerful. Adobe is aiming PhotoDeluxe Home Edition at that market.

With a friendlier and easier-to-navigate menu system, many Photoshop tools have been either removed or disguised as a series of project icons running along the top of the screen.

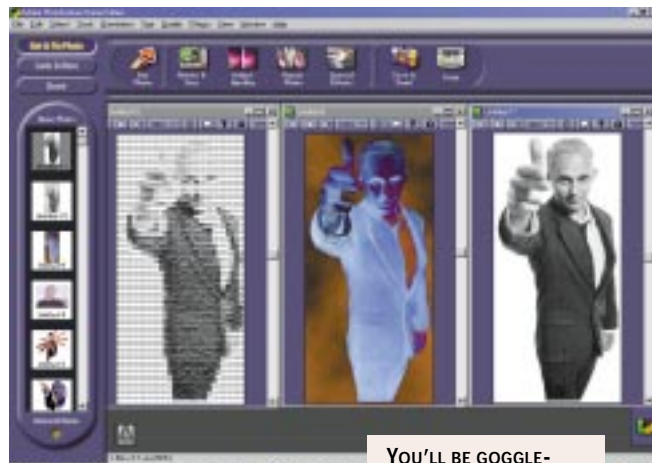
Hit 'advanced menus', though, and you'll find many familiar options return for advanced editing. Poke around a bit more and you might be surprised to discover that, like Photoshop, PhotoDeluxe is layers-based, letting you apply edits on separate layers, to avoid ruining work already completed.

The package launches with a short video guiding you through its most important areas, and when you're actually using the package the emphasis seems more on fun than business. Click on any of the menu icons and you will be led, step by step, through projects for creating calendars, greetings cards, labels and various other novelties using your own images. Considering the release date, we were a little surprised that the calendar activity could only cope with the years 1999 to 2003, especially as 1999 is over.

Images themselves can be stored in a virtual album for easy organisation, making this a good choice for first-time digital photographers who are still having difficulty organising obscurely named files.

We were disappointed that unless we activated the 'advanced menus' the smallest increment by which we could rotate our images was 90 degrees, which is no good if all you want to do is straighten up a slightly off-kilter horizon.

Another downfall is the way in which it handled resizing. Although you can scale your images by dragging handles on each corner, the canvas will not resize to accommodate your alterations unless



YOU'LL BE GOGGLE-EYED AT SOME OF THE WEIRD EFFECTS YOU CAN ADD TO YOUR SNAPS

you once again navigate the 'advanced menus', so less experienced users could find themselves unwittingly lopping off edges. On a positive note, it includes a range of pre-set photo sizes enabling instant cropping for frames or wallets.

A range of one-click functions will apply pond ripple, spherical distortion, twirl, diffusion or pinch effects. Similarly, easy-to-use tools zap red eye and remove dust and scratches from battered photos.

It's easy to see how they achieve this latter option as one of the most visible effects is blurring, so if you're thinking of touching up your old family photos in this way for reprinting, then you might achieve better results if you opt for the more advanced tools of Photoshop LE and tackle the job manually.

Artistic effects will turn your image into an impressionist painting or a piece of curled paper, and even disguise your face by slapping on clip art noses and moustaches. This is more of a fun novelty than a practical application, though, and is unlikely to fool anyone.

Perhaps the most ambitious function

is the 3D clip art in which your images are applied to the sides of 3D lorries, books, airships and so on. These can in turn be dropped onto a static background and then sent to friends, along with a browser in which they can be viewed and rotated.

If all of this seems a little too ambitious, then an alternative,

PhotoDeluxe's PhotoParade option, links images, sound and movement into a multimedia presentation, again with its own integrated viewer.

In all, PhotoDeluxe is an easy-to-use and fun way of manipulating and storing images. Novice users will welcome the project-based, step-by-step approach to achieving common tasks, while those with more experience should find much of what they need on the 'advanced menus'. £45 all in is a good price to pay, but for another £30 you can get your hands on a copy of Photoshop LE, which for the more advanced user may be a more suitable buy.

NIK RAWLINSON

PCW DETAILS



Price £45.83 (£39 ex VAT)

Contact Adobe Systems
0131 458 6842

www.adobe.co.uk

System requirements 233MHz processor, Windows 95/98 or NT4 with Service Pack 5, 32MB RAM (64MB RAM for NT), 100MB hard-disk space, Colour monitor with 800 x 600 resolution and 16bit colour, CD-ROM drive

Good points Easy to use, project-based, surprisingly powerful

Bad points Inexperienced users may be daunted by the need to slip into the 'advanced menus'

Conclusion Great for simplistic editing, but Photoshop or Photoshop LE may be more suited to most tasks

NU 2000 and Systemworks

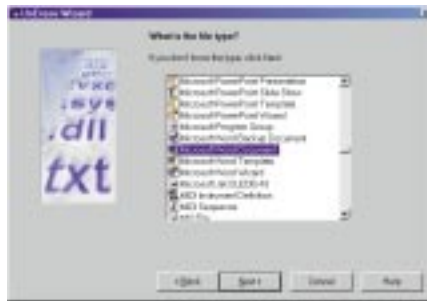
Workhorse utilities packages may not **set your pulse racing**, but preventing a hard disk crash will.

Norton Utilities (NU) made its name in the early days of the PC and seemed doomed when its key features began to show up in operating systems. Undelete, which had made NU a must-have, turned up first in MS-DOS and then as the Recycle Bin in Windows.

But NU is still going strong and Undelete is still a major reason for buying it. This is because the Recycle Bin caches only files you delete yourself: a Word or Excel file that you close by accident might still be sitting intact on your hard disk but the bin won't see it.

Norton will find it – if you dig into the less obvious options; and it needs to save your bacon only once to justify its price.

Other facilities include a system



check and speedy disk optimisation; a new feature is the ability to use a Zip or Jaz cartridge as a rescue disk, producing your familiar Windows environment rather than the

usual DOS prompt. Norton System Doctor, which you can choose to load on start-up, offers a choice of metrics of system performance.

SystemWorks 2000 integrates NU under a common interface with three other major Norton products: AntiVirus, CleanSweep and CrashGuard.

The first is the best-selling anti-virus package, with a year's free online updates; further updates cost £2.50 a year; CleanSweep keeps your disks free of Internet clutter and monitors Uninstalls; and

CrashGuard protects against crashes.

For £20 more you get a Professional version offering Norton Ghost, a disk cloner, and Y2K debugging.

CLIVE AKASS

PCW DETAILS

★★★★★

Prices Norton Utilities 2000 £46.99 (£40 ex VAT), SystemWorks 2000 £85.99 (£73 ex VAT) or £105.99 (£90 ex VAT) for the Pro version

System requirements Windows 9x, 86/66 PC or higher, 16MB RAM, 95MB hard disk space 2x CD drive or faster

Contact Symantec 01628 592222 www.symantec.com

Good points Both packages offer very useful utilities

Bad points Undelete interface slightly cumbersome

Conclusion Norton Utilities still good after all these years; but SystemWorks 2000 is better value in terms of bangs-per-buck

Adobe PressReady 1.0

Colour proofing from the desktop which may let you **strike the bureau off your list of overheads**.

Professional colour-proofing is an expensive business. Recently, chemical-based processes such as Dupont's Cromalin and 3M's Matchprint have been superseded by inkjet technologies, but prices are still in the £15

per A4 page range. So Adobe's PressReady will be viewed by designers as a cash-saving miracle. Small-business users who produce their own colour marketing materials will also benefit.

PressReady turns an inexpensive inkjet colour printer into a professional colour-proofing system. Too good to be true? Well, it depends. The quality of any system depends on careful setup, and maintenance, as well as using the right materials. Colour management is far from an exact science and output quality



can vary enormously. But PressReady can give you an output difficult to distinguish from a bureau-produced proof.

PressReady works by creating a colour-calibrated PDF using the

PressReady printer driver. Prior to printing you can set an ICC profile for your printer to simulate press output.

Once you've set things up, PressReady works transparently. You just choose printer settings for each job from within your design application using file/print/properties. The PressReady properties panel allows you to set paper type, size and so on.

PressReady can also be used to produce colour-calibrated PDFs using the Create Adobe PDF applet. These can

be distributed to clients who, providing they have a supported printer, can produce the hard copy proof themselves.

PressReady already supports an impressive array of printers, and more will be added, presumably when Adobe gets around to producing ICC profiles for them.

KEN McMAHON

PCW DETAILS

★★★★★

Price £105.75 (£90 ex VAT)

Contact Adobe 020 8606 4001 www.adobe.co.uk

System requirements Pentium processor, Win95, 98 or NT4 48MB RAM, 280MB disk space

Good points Inexpensive, easy to use

Bad points Accuracy relies on correct setup and maintenance

Conclusion Cheap colour proofing for the masses

McAfee Office 2000 v 2.0

Six programs in one **may seem like good value** but it could be a case of a few bad apples...

The latest version of McAfee Office 2000 is a collection of six different programs that the company sells separately, bundled together in one easy-to-access suite. The six products are: VirusScan, First Aid, Nuts and Bolts, Y2K Survival Kit, Oil Change and Uninstaller. McAfee has designed a good central interface, Office Central, from which you can access each of these programs, or update them to the latest version in one click.

The best of the six is definitely the excellent VirusScan. Once installed it runs in your system tray, scanning your files for known and undiscovered viruses. What makes this virus checker so good is that, unlike some, it scans for hostile ActiveX and Java code on the web pages you visit and checks files and email attachments for viruses as you download. McAfee offers a weekly update service which includes the ability to update the scanning engine as well as the virus definition files.

Another useful program is Uninstaller. Although most programs have their own uninstallation functions, they do not always remove all the files and registry entries that it created. You can uninstall programs through its interface: if the targeted program already has an uninstallation feature of its own it will launch that. Afterwards, however, it will check that all the necessary entries have been removed.

There is also a separate function that scans your hard drive and registry looking for files and entries that are no longer used and are slowing your computer down. You can archive applications to save disk space, move them to different directories or drives, and free up hard disk space by deleting things such as help files and multimedia files if you get desperate for space.



We reviewed First Aid in our November issue, and were not impressed. It is little more than a consolidation of the features already available in Windows. In its favour it has an easy-to-use interface – you just ‘click where it hurts’ to solve the problem you’re having. There is an extensive knowledge base, although it is not much better than the information contained in

the Windows help files and Microsoft’s Knowledge Base on the web.

The novice may find it useful, but be warned, when we tested various versions of this program it sometimes caused more problems than it solved, crashing at various points.

Nuts and Bolts is a more powerful version of First Aid. However, most of its best features are duplicated in the uninstaller program above, and some of the rest can be achieved using Windows anyway. Disktune, for example, is simply another version of disk defragmenter that you can find in the system tools section on your start menu.

Other features include Discover, a utility that allows you to drill down into your system, displaying information about your hardware and operating system and enabling you to look at the

amount of resources each program currently running is using.

An undelete feature helps you out if you’ve emptied your recycle bin and need the file back, Shredder permanently deletes sensitive files and Fortress encrypts files with a password to prevent others opening them. Again, this showed signs of instability, crashing our test

machine completely when we used its quick copy feature.

Y2K survival kit did not impress us. It claims to check all of the relevant clocks and scan the hard drive, reporting on the year 2000 status of your applications. It crashed constantly on our test machine, however, and you would be better off using one of the many other products on the market. Oil change is a program that updates your programs from the web.

Overall, there are only two programs worth having, which makes the £50 price tag seem steep, but it could be of use if you don’t already have virus protection and your hard drive has become bloated through months of installing and removing cover disc software.

JASON JENKINS

PCW DETAILS

★★★

Price £49.99 (£42.54 ex VAT)

Contact Network Associates
01753 827 500
www.mcafee.com

System requirements Windows 95/98, 486 processor, CD-ROM, 140MB Hard disk space, modem

Good points VirusScan and Uninstaller are stable and useful...

Bad points ...but the others aren't

Conclusion If you lack virus protection software and your machine is slow, then this could be useful. Otherwise you may be disappointed

Omnipage Pro 10

Powerful and versatile OCR software that will **quickly make itself indispensable** – as an upgrade.

Going strong since 1988, Caere Corporation has long been the recognised market leader in OCR (optical character recognition) software. This latest version of its best-selling package is the product of a merger with two competing companies. OmniPage Pro now offers the combined and refined power of three independently developed OCR engines.

The interface is certainly a delight, intuitive enough to get a novice up and running with barely a glance at the manual. Operational options include fully automatic (one click and you're done), manual (where you specify, for example, which areas of the page should be treated as tables, which as columns



etc) and Wizard (for that extra helping hand). A system of algorithms attempts to come up with the correct word when in

doubt, and the proof-reading tools let you correct text within the application before the final version is exported, in fully editable form, to a word processor.

Page formatting can be ditched altogether, partially preserved or, if you select the True Page feature, OmniPage Pro will attempt to retain every detail of the original document's layout. Graphics are captured in colour or greyscale, and a nice touch is the read-back feature which speaks aloud the finished text.

If you've tried the OCR software that came bundled with your scanner and found it wanting, OmniPage Pro 10 is the upgrade of choice.

KYLE MACRAE

PCW DETAILS

★★★★★

Price £79 (£67.23 ex VAT) as an upgrade to any OCR software; otherwise £395 (£336.17 ex VAT)

Contact Caere Corporation
0870 870 8085
www.caere.com/uk

System requirements A Pentium processor, Windows95/98/2000 or NT4, 32MB RAM, 50MB hard disk space (90MB recommended). A scanner and sound card are both optional

Good points A dream to run yet fully-featured under the hood

Bad points The pricing is absurd, nobody should pay more than the upgrade option

Conclusion Superb OCR, sophisticated formatting tools, and a simple interface.



ZipMagic 2000

Downloads getting you down? **Cramping your disk's style?** Allow ZipMagic to cast its spell.

When hard disks were tiny, over-burdened affairs, Zip programs offered a smart solution where seldom-used files could be compressed to a fraction of their former size. But with today's cavernous disks, the future of



Zips is assured by the growth of their use on the Internet. Many files can now be downloaded only in zipped format.

Data archived in a Zip is trapped in a virtual limbo. If you fiddle around with a zipped file, first you must extract and uncompress it using a Zip program – a tedious and sometimes confusing business. ZipMagic does away with this nonsense by fooling Windows Explorer into treating a Zip as a regular folder rather than an impenetrable storehouse.

The files within behave just like any others, perfectly happy to be opened, changed, closed,

dragged and dropped, copied and pasted. ZipMagic performs its clever trickery behind the scenes without any visible intervention. The result is smooth, quick and seamless Zip file manipulation.

Email integration and a built-in graphics viewer add to the appeal, and a stop-start download manager protects against interrupted file transfers. This is an impressive Zip utility for its ease of use alone. However, as a download typically requires no further attention once

unzipped, ZipMagic 2000's main innovation will appeal most to those who work with home-made archives.

KYLE MACRAE

PCW DETAILS

★★★★★

Price £29.95 (£25.49 ex VAT)

Contact Mijenix Corporation
01297 552 222
www.mijenix.com

System requirements A 486 processor or better, Windows9x or NT, 8MB RAM (16MB recommended), 11MB hard disk space

Good points Allows easy access to zipped files

Bad points Limited appeal to those who only unzip the odd download

Conclusion If you're short of disk space, a seasoned surfer or just obsessively tidy, ZipMagic 2000 offers power, flexibility and features aplenty – with an added twist of true inspiration

Learning Red Hat Linux

If you're new to Red Hat Linux this clear, **comprehensible** book could be the one for you.

It's easy to quantify the size of the market for *O'Reilly's Learning Red Hat Linux*. It's the six million – and more – people who began to use Linux after it shot to fame in late 1996. They represent a vast new readership that needs an introduction to both Linux and the underlying Unix-like concepts. For them, author Bill McCarty has compressed a beginners' guide to this most complex operating system into 351 pages, leaving out the incomprehensibility that characterises other Linux guides.

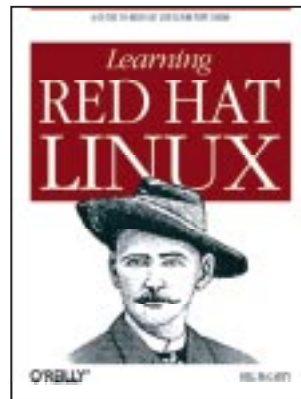
Learning Red Hat Linux occasionally assumes too little knowledge. The 73 pages on installing the OS repeat much of the material in Red Hat Linux's own vastly improved installation manual. While the book adds a little – the section on using the *fips* utility to resize partitions, for example – the content of these 73 pages doesn't really justify their existence here.

The book really comes into its own from page 74 onwards, where its comprehensive look at Linux's data system includes a well-pitched explanation of its device partition and

basic Unix tools such as *tar* and *gunzip*.

From the 'lpc' printer queue query to mounting floppy drives, from compressing files to making symbolic links, it manages to include the essentials that other books leave until too late. Knowing, for example, how to check partition space immediately after installation is an essential troubleshooting routine if, say, you plan to run space-hungry Office suites like StarOffice.

Beginners' books on Linux have become possible because tools like *linuxconf* and *Gnome* hugely simplify configuration. *Learning Red Hat Linux* capitalises on this by minimising command line configuration and concentrating on getting systems up and running. As a result it has excellent chapters on setting up Linux LANs, WANs and configuring Samba.



On the way it passes through the stuff you bought Linux to do: running the Apache web server and sendmail email, and using the system as a LAN router.

It's all spot on in tone and technical detail, but what really sets this book apart are the final two chapters on using the shell and shell scripting. They are clear

and comprehensible – an excellent introduction to one of the most intimidating aspects of Linux, and a great springboard for more advanced study.

LEE KIMBER

PCW DETAILS



Author *Bill McCarty*
 Publisher *O'Reilly*
 Price *£23.50*
 ISBN *1565926277*

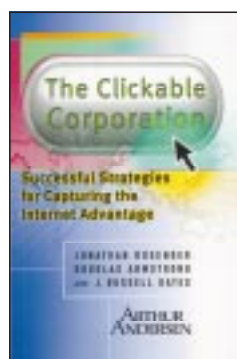


The Clickable Corporation

Find out what **major companies are doing on the web** and how you can follow in their footsteps

Your liking of this book depends largely on whether you are happy to believe the expert analysis of Arthur Andersen. Regardless, it is an insight into 25 well-known companies engaged in e-commerce, including Dell, Federal Express and Charles Schwab.

Instead of having one chapter on each company, however, the book takes a practical approach to helping the 'netrepreneur' build a successful online venture. Chapter one covers the benefits of being online and the pitfalls of ignoring it; chapter two demonstrates how sharing knowledge with competitors and partners can benefit rather than damage you; the third



chapter covers helping consumers make a choice, while chapter four looks at offering convenience. We then drift through customisation, making savings, creating customer communities and boosting profits by using entertainment.

Each chapter's topic is enhanced by a look at two or three companies, with a quick summary. This makes the book as easy to browse as it is to read in full.

The Clickable Corporation is aimed at the business strategist, as the Arthur Andersen tag might suggest, rather than the webmaster. It will help you understand how to effectively turn your business into a modern, online, cost-

saving, profit-making entity, and it won't blind you with nerdy jargon.

The easy style and good organisation of this book, coupled with the fact that it centres on the experiences of 25 proven online ventures, make it a most enjoyable read. It is one we highly recommend.

STEVE MASTERS

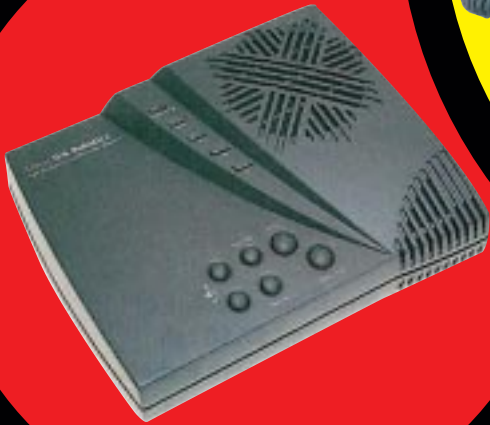
PCW DETAILS



Authors *J Rosenoer, D Armstrong and JR Gates*
 Publisher *Free Press*
 Price *£17.99*
 ISBN *0684855534*

For more book reviews visit the VNU website at www.vnunet.com





All-in-one machines *vs* answerphone, fax and modem

With office machines taking up **a lot of desk space**, does it make more sense to combine them?

If you work in a large company's offices, take a look around you and note just how much equipment is scattered about. There is probably a fax, a printer and a photocopier, not to mention a scanner, voicemail on your phone and a connection to the Internet via a modem or the internal network. Then just think about squeezing all that equipment into your back bedroom, which is what you would have to do if you wanted to set up a home office. You also need to think about the cost of buying each of these separately – the expense will undoubtedly eat into a fair chunk of your business start-up funds.

One way to cut down on both clutter and expense is to use all-in-one machines.

Fax/printer/scanner combos have been around for a while and are reasonably good at performing each of their functions. Another option to consider, however, is to combine the functionality of a fax, modem and answerphone all in one machine. While you can buy modems with voice functionality that can also act as answerphones and fax machines, these require the PC to be at least in stand-by mode, ready to receive faxes and voice messages as they come in.

However, one alternative is the self-memory modem, which stores faxes and voice messages even when your PC is turned off. Self-memory modems differ from ordinary voice-capable modems, in that they have a certain amount of RAM

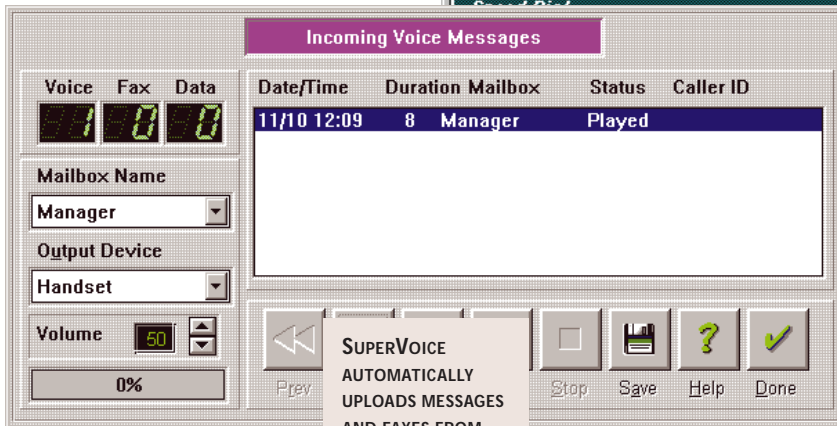
to store incoming faxes and voice messages. The amount of RAM on self-memory modems differs from modem to modem, with most able to store anything between seven and 20 minutes of messages, or 40 to 50 fax pages. However, some models allow you to add additional memory, should you find yourself running out of space.

While some self-memory modems are controlled by software from the PC, better ones will have buttons on the front to allow you to listen to your messages without turning on your PC, giving them more of the flexibility and functionality of an answerphone. Faxes, of course, still have to be retrieved and printed via the PC.

All-in-one or standalone?

Before you rush out and buy an all-in-one device, you should consider your needs and whether you are better off with separate bits of equipment. If you prefer to have your faxes printed out on paper, rather than having to mess around with software packages before you can view them, you would do better with an actual fax machine. Also bear in mind that if you receive faxed forms that have to be signed and returned, receiving them electronically can be more trouble than it is worth. In this case the electronic fax has to be printed, signed and scanned before it can be sent again in electronic form. Of course, if you have a fax machine all this can be eliminated, as you simply sign the fax and send it back via the fax machine.

Also think about the number of faxes you are likely to receive. If you receive a 30-page report by fax while you are out,



SUPERVOICE'S MAIN WINDOW CLEARLY DISPLAYS HOW MANY VOICE, FAX AND DATA MESSAGES YOU HAVE

will the self-memory modem run out of RAM before the document is finished, leaving you with only half a report? In this case it may be better to have a fax machine, although you can use a fax-modem, but simply leave your PC in sleep mode and set to wake up when a fax comes in, so the fax can at least be saved to your hard disk. Good self-memory modems should have expandable memory, so you can add more RAM to store additional voice messages and faxes.

However, there are several advantages to having faxes in electronic form. You can move one step closer to the paperless office, so your faxes can be easily filed away and stored with your other PC-created documents. This means no more ferreting around under piles of paper trying to find that important fax. But you might want to invest in some more hard disk space if you are going to be storing a lot of faxes. Receiving faxes electronically also makes optical character recognition

(OCR) a doddle, as the document can be passed over to the OCR software directly and does not have to be scanned. Cutting out this scanning of faxed pages should also increase the accuracy of the OCR, as characters will be less distorted than scanned fax characters.

Self-memory modems also upload voice messages to your PC. This is a distinct advantage if you want to store various messages. For example, if one of your customers places a complicated order on your answering service you may want to save it to be checked later. Or should you happen to be in a dispute with a customer or supplier, you may find it worthwhile to keep a copy of that message safely on your PC. Digital answer machines can often let you choose to

save individual messages while wiping others, but standalone machines can't then upload these messages to your PC. The software on the self-memory modem we were testing opted for a belt-and-braces policy of always playing the message to you before it could be deleted, so you cannot accidentally delete the wrong message.

However, as with all multi-function devices, you should stop to think about what would happen if the modem went wrong. Would you then be left high and dry with no chance of receiving faxes or recording messages until the problem is resolved? If you are out the office for much of the time and depend on your voice messages and faxes to keep on top of your business, this is going to be a major headache.

Self-memory modems

If receiving faxes is a priority for you and you don't fancy using a self-memory modem, there is another way of picking them up as and when you want them, and from wherever you are. Fax-over-email services are springing up all around us. These services are run by ISPs and specialist providers such as FaxServe. The user is allocated a fax number and then anyone sending a fax will dial this number in the same way they

You should stop to think what would happen if the modem went wrong

would dial the number of any fax machine. However, instead of going directly to the recipient, the fax is bounced to the service provider's servers, where it is converted from a fax image file into a PC-compatible image file, usually a .tif file. This image file is then forwarded to the recipient's email account. Check with your ISP if they offer the service, or contact FaxServe at www.faxserve.co.uk.

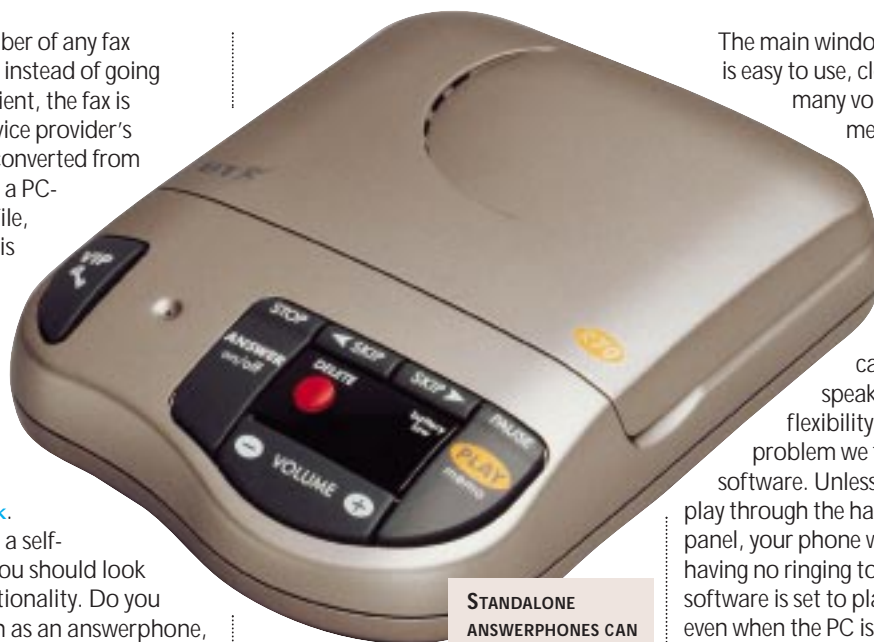
When choosing a self-memory modem, you should look carefully at its functionality. Do you want to use it much as an answerphone, able to listen to the messages when the PC is off? Then you will need to look for one that has buttons on the front to play, fast-forward, rewind and delete messages and one that has a speaker built in.

If you are working with more than one person in an office, or working from home and want to separate work and personal messages, you may want to find a modem that can handle multiple voice mail boxes. This allows each person to control their own voice messages, ensuring privacy and that the messages are not erased before the intended recipient can listen to them. Mailboxes can be protected with a PIN for increased security.

Also look for a modem from which you can retrieve faxes and voice messages remotely if you are going to be away from the office for long periods of time. After all, you don't want to remain out of the loop for too long. Many fax-

modems have this functionality and it allows you to listen to your voice messages from a touchtone phone and retrieve your faxes to a remote fax machine or a PC with a fax-modem. In most cases you will be able to set the modem to automatically forward faxes to a specific fax machine, or set it to fax back, that is to send the fax to you, wherever you are, when you call the modem.

Look carefully at the amount of memory the modem has, if it will be enough for your needs and whether you can increase the memory if necessary. For example, if your business expands and



STANDALONE ANSWERPHONES CAN HANDLE MESSAGES BUT MUST BE SUPPLEMENTED BY A FAX MACHINE

you take on more staff, each with their own voice boxes and faxes coming in, you will undoubtedly need to add to the modem's memory.

Putting it to the test

To see how self-memory modems matched up against separate devices, we tried out 3Com's 56K Professional Message Modem. As with all self-memory modems, it is an external machine, which draws its power separately.

On the front of the device is a large speaker and a microphone, so you can listen to your messages without switching on your PC and record your outgoing message. There are also buttons to switch the speaker off and turn the volume up or

down, as well as to play, fast forward, rewind, record and delete messages.

The modem connects via the serial port and comes with a two-port telephone jack, so you can plug in your modem and your phone at the same time. It has enough memory to save 20 minutes of messages or up to 50 fax pages.

The modem is easy to set up. The drivers installed without any problems and the bundled SuperVoice 2.2 software was equally hassle-free. SuperVoice has been modified for use with this modem and so any messages and faxes left on the modem's memory will be automatically uploaded to the PC when the software is next booted.

The main window for the application is easy to use, clearly displaying how many voice, fax and data messages you have.

Voice messages can be played back through the modem's speaker, through your phone's handset or through a sound card to your PC speakers. This very flexibility caused the only problem we found with the software. Unless the software is set to play through the handset in the control panel, your phone will not work properly, having no ringing tone. Similarly, if the software is set to play to the handset, even when the PC is switched off, you will not be able to listen to your messages via the modem's speaker. However, should you want you can use the modem as a hands-free device, allowing you to bin your phone altogether.

The software is able to detect the difference between voice calls and faxes and will display a fax icon on the screen when a fax comes in, so you don't pick up the phone to the squeal of a fax.

Voice messages can be saved as .vox files in any location you choose. This means that you can keep important messages from specific clients or suppliers in folders with your other communications from these companies, making sure you do not lose any information.

We found the modem was just as easy to use as having separate pieces of equipment. The ability to leave the PC turned off, while being sure of receiving faxes and voice messages was a distinct advantage. All the functionality was on a par if not better than having separate pieces of equipment and saved a considerable amount of space – the Professional Message Modem is just 7 x 6in and 2in tall. And it worked out considerably cheaper than buying an answerphone, fax and modem, coming in at just £99 ex VAT.

However, the modem offers little more than other voice-compatible fax-modems. The ability to use it when the PC is switched off is an advantage in certain situations. But many would rather keep their PC switched on and save themselves the extra £40 that these modems cost when compared to other voice-compatible internal modems.

ADELE DYER

If your business expands, you will need to add to the modem's memory

Windows of change

WINDOWS 2000
PROMISES THE
WORLD BUT
DOES IT
DELIVER?

TERENCE GREEN
GIVES YOU THE
DEFINITIVE
GUIDE TO THE
NEW OS

WINDOWS 2000 WAS TO HAVE marked the spot where Windows 98 and NT converged, but that changed a year ago when

Microsoft decided to extend the lifespan of Windows 98. The change, of course, seems to be more a consequence of Microsoft restructuring its business divisions than a sign that Windows 2000 Professional isn't a worthy upgrade for Windows 98. Windows 2000 is late so Windows 98 had to hang in there anyway, but Microsoft has also created a Consumer Division which recently released an early beta of a home-user Windows called Millennium. If the anti-trust case results in Microsoft being broken into Baby Bills, it's likely that Consumer Bill and Business Bill will each have a Windows, leaving Windows 98 to fall between stools.

Windows 2000 encompasses a server family and Windows 2000 Professional, the desktop client which takes over from NT4 Workstation. The Server family extends to Windows 2000 Server, Advanced Server and DataCenter Server. Each step supports more processors by default, four, eight, and lots respectively. Other version differences are mainly of interest to large organisations with humungous applications and networks.

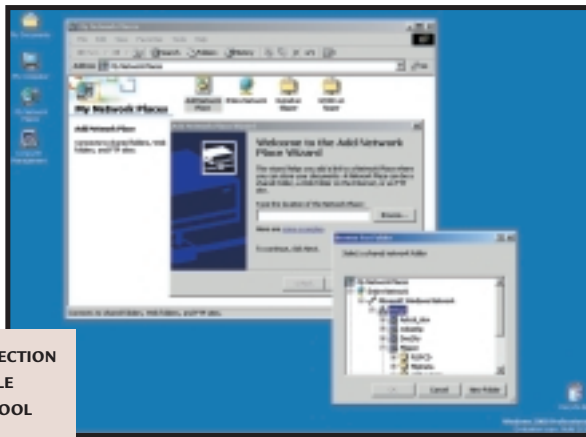
Much has been said about Windows 2000 since the first public beta appeared in late 1997. Now it's coming to the crunch. The big questions are: Will it run games and is it the best business desktop? Strangely enough the answer to both is a qualified yes. Ironically, given the recent flood of cheap, powerful Pentium II systems, the hardware Windows 2000 Professional needs is more likely to be found in the home than in business. Next question.

Should you rush in? If you have the hardware, yes. If not, best watch and wait while the pioneers take the arrows.

Consumer

Windows 2000 Professional looks and feels like Windows 98, but has an enhanced user interface which customises itself as you use it. Menus and dialog boxes adapt to show only the most recently used choices, lists are presented in most-recently used order, and on-screen folder clutter is reduced to simple My Documents and My Network Places folders. The aim is to avoid confusion by presenting similar information in a single location, keeping it simple so you aren't shown the entire network unless you actually ask to see it, and providing good search options when you need to track down a computer or resource.

There are also more Wizards which help to configure network and Internet connections, hardware, and software. The Network Connection Wizard (see screenshot overleaf) brings all the disparate tools for connecting to other computers over LANs, dial-up connections, and wired and wireless connections under one heading. Other new wizards hold your hand as you add new hardware and software. Configuring Windows, even Windows 98, has never been this well co-ordinated. Experienced Windows NT Workstation users will find some of the new features irritating and intrusive because there are now more clicks between you and where you want to go. But newcomers are better served by the new user interface and on that measure it meets Microsoft's design goal to make Windows 2000 accessible to a wider audience. Old hands may grumble, but can always reset the UI to work in the old familiar way.



NETWORK CONNECTION WIZARD: A SINGLE CO-ORDINATED TOOL FOR MAKING ALL EXTERNAL CONNECTIONS

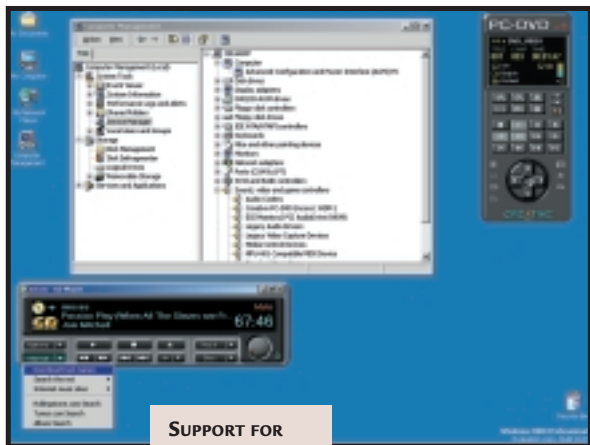
Windows NT Workstation has always been criticised for lack of hardware support. Windows 2000 supports a vast array of peripherals and has integrated support for Plug and Play, power management, and new technologies such as USB and DVD. But to be a more stable and reliable platform than Windows 98, Windows 2000 is less forgiving of hardware and driver foibles. Stuff which 'sort of works' in Windows 98 won't suit Windows 2000.

Although many older computers and

legacy ISA peripherals are supported, the best hardware for Windows 2000 is recent hardware. Plug and Play PCI cards and a BIOS which supports the Advanced Configuration and Power Interface BIOS are good to have. ACPI, unlike Advanced Power Management (APM) which is controlled by the PC BIOS settings, allows Windows 2000 to control card and peripheral configuration and power management automatically. But ACPI can only work if all hardware devices and their drivers support ACPI. Any non-Plug and Play ISA cards or peripherals with unsuitable drivers will defeat ACPI.

When Windows 2000 installs it makes a careful and extremely time-consuming check to see if ACPI can be supported. Simple issues, perhaps a single peripheral in an otherwise all-ACPI system, can tip the balance against support. In that case you get standard PC support which may include some APM features depending on the PC BIOS settings.

Ideally, a Windows 2000 desktop should have an ACPI-compatible BIOS and no ISA cards. A complete list of hardware that Microsoft has tested can be found in the hardware compatibility list (HCL) on the Microsoft website (www.microsoft.com).



SUPPORT FOR ALL THE LATEST MULTIMEDIA HARDWARE

To widen its user appeal Windows 2000 had to provide better support for games than the rather weak DirectX 3.0 emulation in Windows NT. This has been achieved through the DirectX 7.0 layer in Windows 2000 which allows it to offer the same level of support for multimedia applications as Windows 98, provided video, audio, and games peripheral vendors come up with the drivers. At the time Release Candidate 2 became available most of DirectX 7.0 was working well, but drivers for most of the current hot 3D video cards hadn't been finalised.

Power user client

Business users may scoff at games, but Windows 2000 brings multimedia into the business arena with reliable support for audio, video, and new technologies such as DVD and IEEE1394 (FireWire). Streaming video over the network for education and training is an obvious use; more business multimedia applications will follow once the platform is there.

Power users running multimedia need high-performance hardware. Unlike Windows 98, Windows 2000 supports up to two processors and can make full use of them. Simply moving an application from Windows 98 to a Windows 2000 dual-CPU system has a dramatic effect on performance. No changes to the application are required and dual-CPU systems are cheap these days. The cheapest option, although unsupported by Intel, is to match a pair of Celerons with the Abit BP6 board which has twin Socket-370s, or with a dual-processor PII/III motherboard by means of a Slot 1-Socket-370 converter. But, with 450MHz PIIs costing a little over £100, why not go for the real thing instead?

High-performance applications need a solid platform. Windows NT suffered through not supporting new technologies which Windows 98 does, and because it can fall victim to the same driver quality problems that bug Windows 98. Windows 2000 fixes this with digitally-signed, quality-approved device drivers, and with the Windows Driver Model which enables peripheral manufacturers to create a single driver for both Windows 2000 and Windows 98. WDM means Windows 2000 gets drivers when Windows 98 does (see screenshot on following page).

Digital signing tells users a driver has been approved by Microsoft. You may install an unsigned driver, but if problems ensue the culprit will be easier to identify. These features save time and hassle. When we installed Windows 2000 onto a system fitted with a Creative DVD drive/decoder, the MPEG2 card was not recognised; it sported a yellow exclamation mark in Device Manager. The Creative website revealed a Windows 98 WDM driver which we downloaded knowing it would also support Windows 2000.

The driver installed without a hitch, pausing only to display its digital signature, and thereafter the MPEG2 decoder was fully functional.

In addition to driver signing, Windows 2000 tightens up reliability by introducing system file protection to prevent vital system files from being replaced, the so-called 'DLL Hell' when new software or drivers are installed. SFP checks file signatures and allows the installer to think it has completed the install successfully but won't allow system files to be overwritten.

Power user network

The reliability provided by driver signing, the Windows Driver Model, and the System File Checker help to protect your data by ensuring that it isn't lost through system failure. The other side to reliability is keeping your data secure from unauthorised exposure or alteration. Microsoft has been active in this area because Windows NT lacked some security mechanisms that are becoming important in the connected world. Windows 98 also lacks these protections, but Microsoft wants Windows 2000, not Windows 98, as the preferred business client.

Accordingly, Windows 2000 is very security-conscious. Support for Kerberos and the Public Key Infrastructure (PKI) provides standards-based ways for Windows 2000 users to authenticate themselves on external networks, of business partners for example, and over public networks such as the Internet. Integrated support for Smart Cards can be used to back up the authentication by enabling a more secure login than simple user name and password.

Transmissions over networks can also be made more secure through use of Windows 2000 integrated VPN (Virtual Private Network) security. VPNs create private communications channels (referred to as tunnelling) over public networks such as the Internet. Microsoft has added two standards-based protocols, L2TP and IPSEC, to Windows 2000 to support enhanced encryption for authentication and data transmissions. Encryption at the desktop is also provided for. The Encrypting File System encrypts files, folders, and drives. It requires the new version of NTFS (NT File System) that comes with Windows 2000.

NTFS for Windows 2000 can only be used on drives holding Windows NT and Windows 2000. It doesn't support other versions of Windows or non-Microsoft operating systems. The old NTFS system is still available if you need to dual boot with Windows 98 or another operating system and Windows 2000 can now see FAT32 drives which is good. You are given a choice to use the new NTFS and in most cases should go for it, not only for encryption, but for content indexing and file tracking, which solves the missing shortcut

problem caused when a file referenced by a shortcut is moved.

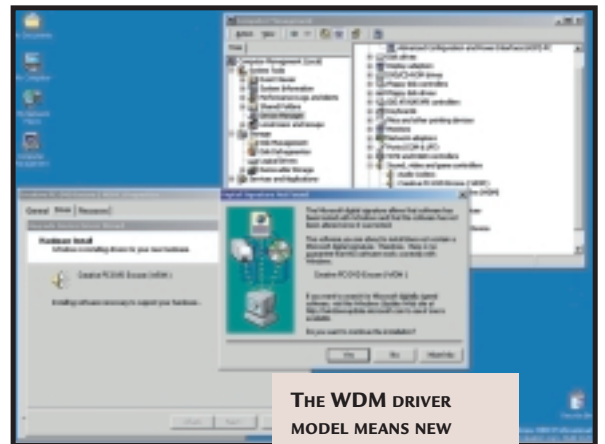
Windows 2000 also supports a host of new storage features to make life easier for network administrators. These include a disk defragmenter at last, disk quotas to prevent file servers from running out of space, and volumes which can be extended without rebooting in order to grow storage dynamically (see screenshot bottom)

SME user

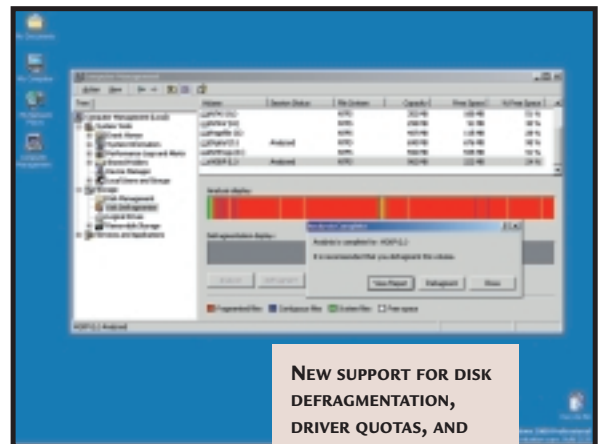
Making life easier for the network administrator is a core design point for Windows 2000. Microsoft wants it to be the best network client and, when used with Windows 2000 Server, to reduce the cost of implementing and maintaining network clients - referred to as Total Cost of Ownership (TCO). This will be on your mind if you're running a Windows NT file and print server for Windows 9x desktops, so how do you reduce TCO with Windows 2000? Like porcupines making love - very carefully.

First you need hardware fully supported by Windows 2000 Professional, preferably ACPI-compliant with no legacy cards. Mostly that means kit purchased in the past year. ACPI PCs don't just save money through power management, but through automatic configuration. But it's not a given. If you're buying peripherals and adding them yourself rather than buying a ready-to-run package be prepared for some messing around.

We took a basic system with an ACPI-compliant BIOS, added four PCI cards (network, SCSI, audio, and MPEG2) and an AGP video card, and installed Windows 2000 Professional. It took time to distribute the PCI cards in the PC in a way which did not cause Windows 2000 undue misery. Certain cards need busmaster slots. Others won't tolerate shared IRQs (a PCI fact of life). The moral of the story? ACPI works, but it's easier and probably cheaper to buy hardware where the



THE WDM DRIVER MODEL MEANS NEW DRIVES HAVE TO PASS MICROSOFT'S CERTIFICATION TESTS



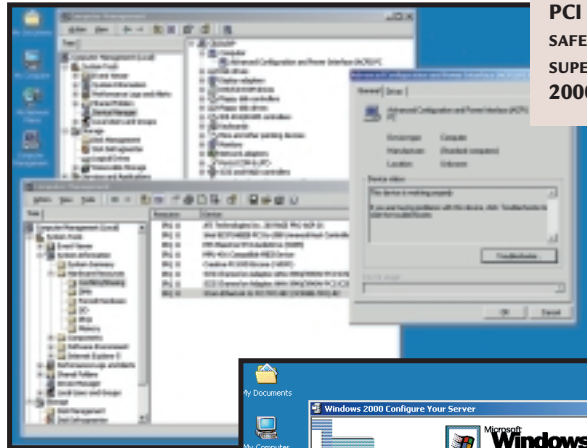
NEW SUPPORT FOR DISK DEFRAGMENTATION, DRIVER QUOTAS, AND DYNAMIC VOLUME GROWTH

vendor/ manufacturer does the testing and verification.

Windows 2000 Professional clients need at least 64MB of RAM, preferably 128MB, and a couple of gigabytes of free hard disk space. If it's not the right time in your hardware cycle to upgrade, you should ensure that all hardware purchases from now on are supported by Windows 2000. Let the early adopters plough through the problems while you prepare to move to Windows 2000 in a year to 18 months once the bugs have been shaken out.

If you and your hardware are ready the next step is to look at your applications. Make sure they're supported, especially if they're custom applications rather than off-the-shelf packages. Windows 2000 is not NT. As a result of the security enhancements in Windows 2000 some NT applications will run on Windows 2000, some won't. Some will run on both but won't exploit all of the Windows 2000 features. Applications that don't support Windows Installer, for example, won't be able to exploit the just-in-time installation which pushes software out to desktops so roaming users can log in and access their applications from any desktop.

So, hardware ready, software ready, you install Windows 2000. You've installed it on new hardware so it looks better than Windows NT or Windows 9x, it runs better, feels better, and is easier to manage. It's a more organised interface, but Windows NT for Dummies it isn't. Windows NT administrators faced with Windows 2000 can spend time looking for familiar administrator tools. Mostly they can't be found or have been hidden in unexpected places. The interface has more to offer, but a studious newcomer can find their way around as quickly as an experienced administrator who doesn't read the manuals. A



training course is recommended, but there is a wealth of information on the Microsoft website.

At this point you have only begun to scratch the surface of Windows 2000.

To make real TCO savings you want to implement IntelliMirror to manage user settings, user data, and applications. IntelliMirror policy-based management controls how and where user data is stored, how their desktop is customised, and how roaming users can access their desktop and applications set from any computer. You can implement IntelliMirror through local policies established on each computer or install Active Directory and implement group policies to give yourself fine-grained, centralised control over network clients and users, remote installation of new operating systems and upgrades, and remote

ACPI SUPPORT AND PCI DEVICES ARE THE SAFEST OPTION FOR A SUPERIOR WINDOWS 2000 EXPERIENCE



ACTIVE DIRECTORY AND WINDOWS 2000 CLIENTS ARE PREREQUISITES FOR FULL TCO BENEFITS FROM WINDOWS 2000 SERVER

Before installing Windows 2000

If you're satisfied with your current operating system you don't need Windows 2000. But if you decide to take the jump there are things to check so your upgrade won't be a leap of faith.

Check the hardware and software compatibility lists on the Microsoft website before installing Windows 2000. There are workarounds for most problems except inadequate hardware. It isn't worth the hassle of upgrading if you have ancient laptops,

desktops with all four SIMMs filled but 16MB of RAM, and esoteric ISA peripheral cards whose drivers never passed the Windows 3.1 stage.

Incompatible software can be worked around. An upgrade installation checks software and hardware and lets you cancel installation. You could opt for a dual-boot system. Install Windows 2000 in a separate disk partition, reinstall compatible software on Windows 2000, and preserve

existing Windows for the incompatible software.

Before installing Windows 2000, look in the PC BIOS setup and ensure ACPI, if available, is enabled. 'Plug and Play OS' should also be enabled. If you have an ACPI BIOS and don't enable it before installing Windows 2000, you can try to recover by upgrading, but will need to reinstall to recover ACPI functions. The absence of an ACPI BIOS isn't a show stopper, APM will do and

Windows 2000 will detect and install the most appropriate drivers.

Windows 2000 sets itself up with minimal intervention and delivers improved networking performance, and easier administration. If it goes pear-shaped the recovery options are better than those in Windows NT. A Safe Mode boot menu offers ways to recover and if disaster occurs, the Recovery Console will boot into a command prompt from the release CD.

Laptops: The power to manage power

If there's anyone who can benefit by upgrading to Windows 2000 now it's the mobile user. If you're lugging a name-brand laptop built in the past 12 months chances are you'll get complete support for Plug and Play, power management, and PC Cards. Windows 98 can give you this too, but it can't give you the added security and stability of Windows 2000.

In Windows 2000 as in Windows 98, power management and Plug and Play configuration are implemented through the Windows Driver Model (WDM), a new driver architecture designed to enable the operating system to manage power and configuration events through ACPI. This allows for sophisticated power management as devices that aren't being used can be powered down automatically and systems left in standby can be powered up as a result of a hardware request to a component, for example an incoming call to the modem.

For Windows 2000 users the immediate benefits of WDM are twofold. Windows 2000 users get new drivers at the same time they become available for Windows 98, because hardware

manufacturers only need to produce one device driver to support their hardware on both Windows platforms. That's a big benefit but even though Windows 2000 users may have the same driver, they also get better stability. This follows from the Windows 2000 system design which isolates the hardware so software problems can't cripple the system.

Windows 98 Plug and Play can misbehave to the point where things stop working or seize up. It can happen because of a poor driver or poor configuration decisions, either by the system or by the user. WDM drivers, because they are tested by Microsoft, are less likely to mess up Windows 98 but Windows 2000 provides even more protection.

Windows 2000 Plug and Play is a layered interface in which the OEM device driver sits at the upper level, isolated from lower-level drivers produced by Microsoft, and isolated from the hardware. Microsoft checks and validates every level and digitally signs OEM drivers. It doesn't guarantee stability, but makes it less likely that Windows 2000 will suffer driver problems than Windows 98.

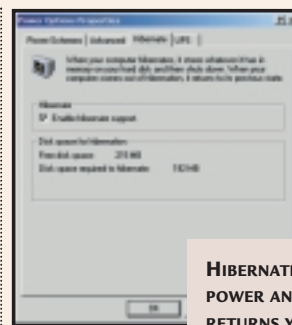
Eventually WDM drivers

and ACPI will enable the OnNow PC which comes to life where you left it, but at present the best Windows 2000 has to offer is a pretty good hibernate option.

Under certain conditions it works for APM BIOSs. When you tell the system to hibernate it stores an image of the system's current state on disk, (it needs as much memory as system memory), and switches the power off.

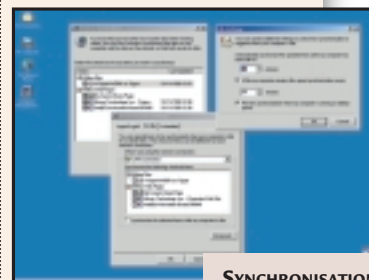
Next time you power up, the system boots and restores itself from the stored image. It's quicker than recovering from Standby, taking less than a minute, and is less fragile than standby or the Windows 98 equivalents. Hibernate isn't new, but it's a generic option in Windows 2000 rather than a vendor add-on which needs special procedures and operates differently on different laptops.

In addition to the hardware benefits Windows 2000 makes it easier and safer to work offline. File encryption and smart-card security protect data, connection wizards help set up connection to networks and the Internet, and network-based documents and folders can be tagged for



HIBERNATING SAVES POWER AND RETURNS YOU TO YOUR DESKTOP IN DOUBLE-QUICK TIME

offline working. This copies files and folders, including web pages, to the laptop drive and keeps them consistent with source documents through the Synchronisation Manager. When you right-click on a file or folder and select 'Make Available Offline' or select the same option for web pages in Internet Explorer the choices you make are stored in Synchronisation Manager which has a wealth of options for timed automatic or manual synchronisation (see screenshot below).



SYNCHRONISATION MANAGER KEEPS OFFLINE DOCUMENTS IN ORDER

diagnostics and troubleshooting. Without Active Directory, Windows 2000 is better than NT and 98 but you'll need Active Directory to make the most of Windows 2000 Server.

Active Directory is the central database in which all machine, user, and network resource data is stored and from which it is all managed, but isn't installed by default when you install Windows 2000 Server. Before you install it you need an in-depth understanding of the implications. There's too much to cover here, but Active Directory will require you to review your network protocols before you install it, and revise key elements of your network. After you have

installed it you will need to cherish it as your network function will depend on it.

At the end of the day there is no doubt that Windows 2000 offers significant improvements over Windows 98 and NT, and so it should after such a prolonged period of development. Good reasons to upgrade include hassles with proprietary laptop power management, Windows NT's lack of Plug and Play support, Windows 9x's lack of security, and the need for specific new features in Windows 2000. But small businesses need to take a cautious approach to active directory, as once it is installed your network will be inextricably linked to it.



Show me

HTML WAS
CREATED IN THE
UK, BUT THE US
HAS BENEFITED
MOST FROM THE
WEB. NIGEL
WHITFIELD
ENCOURAGES
WANNABE
ENTREPRENEURS
TO JOIN THE
INTERNET
GOLD RUSH.

IN THE US THEY SEEM TO BE EVERYWHERE. Baby-faced millionaires who've made quick bucks from the Internet boom. Simple ideas such as Yahoo, Amazon and Priceline have turned 20-somethings into instant millionaires. Americans seem to have a knack for turning a good idea and a bit of legwork with a website into a multimillion-dollar enterprise overnight. And when you look at some of the sites that seem to attract so much interest, you might wonder what's so special about them.

If these people have done it, what's to stop your idea from making you a millionaire as well? You know how to create web pages, you think you have a good idea, so how do you turn your PC into a meal ticket?

While the headlines may make it look like all you have to do to make money is link the word 'Internet' to your business and then sell shares, sitting back while they skyrocket, the truth is somewhat different.

In reality, before you start planning your dream home or working out which model of Ferrari will be in your driveway, you'll need to do a lot more than that. If a report from the Gartner Group is to be believed, you'll need a fair bit of luck. Recent research into e-commerce led the Gartner Group to claim that up to 75 per cent of 'e-businesses' will fail - although that figure

includes traditional businesses attempting to make the transition, as well as start-ups.

Riches aren't guaranteed either. While Internet stocks in the US have risen, it's a stark fact that many of the companies behind them have yet to make any profit. And while the shares that people may have in companies look attractive on paper, all too often that's just what they are - paper. You may attract people to put money into your idea, but there are likely to be strings, and those could stop you from cashing in on the share options for a set period of time.

Even if you are in a position to sell your shares, like those who invested in FreeServe, choose your time. FreeServe was one of the first pure Internet shares to hit the UK market, but it hasn't had an easy time of it. Prices after flotation settled below the launch price, although they've since regained a lot of ground. QXL.com and even Amazon have seen their prices wobble - with the latter varying by almost \$100 (£62.50) in a single month earlier this year.

Go for it

But if you're not put off by those words of doom, gloom - or just sense - what's the first step to becoming an Internet millionaire?

Cliff Stanford, founder of Demon Internet, can be credited with starting the Internet boom



the money

in the UK. From 200 people who each put up £100 for a year's subscription in advance, the company grew into one of the UK's biggest ISPs (Internet Service Providers). When it was sold to Scottish Telecom, it was worth £66m. Stanford netted £33m of this, making him one of the few people to have made real money out of the Internet in the UK so far.

Nearly half of that has now been put into Redbus, an investment company Stanford wants to use to develop his own ideas as well as those from other people. One of his current projects is film distribution over the Internet, and to make that a reality, he's acquired an independent distribution company as well. As he told *PCW*, 'It's going to be who understands the technology best. It's going to be who's got the content.'

People who want to make millions have to do something others haven't done, said Stanford, such as Demon's 'tenner a month' for the Internet. While some believe Dixons' marketing clout played a crucial part in FreeServe's success, Stanford thinks that simply being first with a large-scale service was what made the difference. As with Demon, it wasn't exclusively being the first that made the difference: 'We weren't the first to provide dial-up in the UK. We were just the first to do it right.'

Part of what made it right was keeping customers happy. 'It wasn't always exactly what

they wanted, because you'd have everyone wanting a different service. But you have to get it as right as you can for as many people as you can.'

In starting Redbus, Stanford's advantage was having made money already. For others, it's not so easy, he said. 'It's difficult to go out and say I'm going to do this to make my fortune by selling my company.' The Redbus projects are, he believes, sound business models. They will generate money, regardless of whether they float on the stock market or get sold to a larger company.

Bubbling under

Internet businesses aren't a bubble that's going to burst – although they can prove a rocky ride for shareholders. It's not the profit that counts. FreeServe is worth billions because that's what someone will pay for it, believes Cliff. It has a database of people, it knows what they like, what they're doing, what web adverts they see – and it's that database that makes it worth so much.

Having something that everyone wants – in FreeServe's case the database of users – is crucial. And a business plan is essential, knowing how your idea is going to be sold and to whom.

Charlie Myers, an analyst with venture capitalist company New Media Investors, agreed. 'A great business plan is essential.' You'll need a good grasp of the market, and if you want to

Top tips for cashing in

There's no one way to make your million, but there are some key things to bear in mind if you want to increase your chances of success. While not all the people we spoke to had exactly the same advice, there are some key points that most agree on.

- Be first. There is, according to Redbus's Cliff Stanford, no space for the 'me toos.' You might well think selling books online is a cool idea, but Amazon has done it already.
- Be dogged. Don't admit defeat. There will almost certainly be many obstacles – both technical and financial.
- Be prepared to give up control. It may be your baby, but if you want to attract investment, and you don't already have a track record of success, it's likely

any money will come with strings – and that could mean handing over more than half your company to someone else.

- Have a business plan. It doesn't need to be too detailed, but if you want to attract investment, it's essential.
- Start small and be prepared to grow. And if you have an idea, don't wait around for someone else to have the same one.
- Be prepared to grow fast. If you start small, and stay that way, you'll be overtaken.
- As Charlie Myers at NMI says, 'Sell and don't stop selling your idea,' if you want to attract investment.
- Keep your plans close to your chest. You'll have to give some things away, especially if you want a quick decision, but don't tell everyone you meet.

interest potential investors in your company, you have to 'sell and don't stop selling. Make them believe they can't afford not to invest in you.'

But while the plan is important, that doesn't mean you have to be brandishing your MBA certificate before you can consider approaching people. Groups such as Redbus and New Media Investors provide assistance on the business side for people who have a great idea but haven't,

perhaps, had the experience of running their own business before.

'Are the people right?' said Myers. That's more important than age and experience, and one of the key things they'll look for when assessing an idea is the team you've put together. And increasingly, he said, a lot of high-quality people are prepared to join start-up companies, sometimes working for no money, prepared to take share options instead.

Motivation, coupled with an odd mix of humility and arrogance are key factors that you'll need to drive your plans forward. Plan to take your business forward as best you can – not simply to make millions quickly and then get out.

Finding funding

While the first stop for some may be the high-street bank, unless you have a sound business plan – and experience – you're likely to be unlucky. When you look at other solutions for financing your idea, you'll find the approach varies considerably.

Some venture capitalists, according to Stanford, told him they'd rather pay more money to come into a business that's established as a working idea, rather than risk losing a smaller amount. It's that attitude that led him to start Redbus, which is prepared to help companies stepping onto the first rung of the ladder.

It's that kind of willingness to help at the start that Steve Homer, creator of Gift-Net and the QAZ web directory, thinks marks out one of the key differences between the US and the UK. There are many more 'business angels' in the US, and regulatory issues can make a difference too.

'If you're at the bottom of the ladder, the banks don't want to help you, the venture capitalists don't want to help you. And one of the reasons there are so few business angels is few

You don't need millions to succeed

While the valuation put on companies such as FreeServe can be in the hundreds of millions – or even more – many other companies are making a less spectacular, but nevertheless comfortable living using the Internet. And you don't necessarily need hundreds of thousands of pounds to get yourself started.

GamePlay is one the UK's largest games businesses. Although it started out as a

mail-order company, it now has an extensive website, 38 staff and a turnover of £8m.

Not bad for a four-year-old company. Dylan Wilk, the founder, is 25, and when he had the idea for the firm, he was turned down by high-street banks. In the end, his initial £2,500 funding came from the Prince's Trust. Without that, he said 'I could never have achieved what I have.'

Another successful

business that's relied on the Internet for promotion is Hertfordshire-based JM Communications. A small company specialising in mobile phones and pagers, it has been using an Internet website for over five years.

During that time it has built up a good reputation, helped largely by being one of the first mobile companies online. According to company founder Jonathan Morris, one of the

important things has been 'making it as easy as possible for people to buy' – even if it's just a '24-hour catalogue,' rather than online ordering.

And while the site contains lots of other information, the products are important. Another key is to make sure the site looks like it's regularly updated – even if it's a simple change of colour, so the front page has obviously changed.

Top web start-ups

There are almost as many ways of ranking businesses on the Internet as there are businesses themselves. You can measure the success of a company by the value it achieved when it was floated on the market, or the volume of sales, or the rate of growth. You can look at the gross profit margins, or the time it'll take to break even, or the return on investment.

So, there's no single way to evaluate a company to see what makes it tick. One recent list, called the e25, was compiled for *Management Today* magazine, and considers which UK Internet businesses are most promising for future success.

We've spread the net a little further – but criteria varies tremendously. You could, as the e25 list does, exclude businesses such as FreeServe that grew out of something else. Or you could include those involved with the technology behind the Internet, such as RedHat.

Our list merely covers the ones to watch, but remember the Internet can be a rollercoaster ride, and by the time this article appears, there'll be even more hot companies to consider.

Amazon.com Originally a book seller, Amazon is expanding into other areas, including CDs and consumer electronics. Floated for just

under \$50m (£31.25m) in 1997.

Beenz.com A 'web currency' used as a form of loyalty points by sites, Beenz has raised \$30.5m (£19.6m) in a private share issue.

Boo.com Just launched after a long delay, this site promising sports and fashionware sales, valued at around \$200m (£125m) after a funding round last August.

FreeServe This well known ISP led the free revolution in the UK, and is part owned by Dixons – which disqualifies it from some e-business listings. The share sale valued it at around £1.5bn.

Gameplay.com Specialists in computer games sales,

Gameplay is one of the favourite UK Internet stocks, and was floated for £54m.

LastMinute.com This business specialises in offering late deals on things such as flights and hotels. Valued at around £19m in June, this year's flotation is expected to be worth around £400m.

Netcall Specialists in providing live phone links from websites, NetCall raised an additional £2.7m in November 1999, valuing the company at around £40m.

QXL.com British-based online auction service, floated last year, with an estimated value of £263m.

people have made money out of the Internet so far in the UK.' People who've made money in startup companies already, he believes, will be more willing to invest their returns in others.

Bodies can be just as important as money. And one of the hardest steps is going from being just yourself to having your first employees. One problem those in the UK face when they take on staff is share options – something Homer believes is an important issue that should be addressed.

'The people who get share options tend to be in large companies. To do them legally in the UK is expensive.' Changes announced recently will make it easier, but 'the culture needs to be there', according to Homer, if companies are to find it easier to keep talented people.

What next?

Although there's no simple path to success, the people we spoke to did share some common views. A good idea, motivation and a good team are the essential components for success. When you have those, you don't need to wait around. Groups such as New Media Investors pride themselves on providing 'quick, clever money' and, said Myers, with a good plan, an answer – and a signed cheque – can be forthcoming in weeks, rather than months.

So, what are you waiting for? If you have an idea, make the most of it. There's seldom been a better time to take the plunge and seek your fortune.

Useful contacts

Arthur Andersen

A global accounting group, with useful downloadable reports on e-business and how it's developing around Europe and the world.

www.andersen.com

First Tuesday

First Tuesday is a rapidly growing group of people who work with web businesses. You'll find people with ideas, venture capitalists, and technologists at their meetings – and they provide online newsletters and jobs noticeboards. The website provides links for anyone seeking funding and advice.

www.firsttuesday.co.uk

New Media Investors

An investment organisation that specialises in new technologies. NMI has been involved in some of the best known Internet businesses, including LastMinute.com

www.newmediainvest.com

Prince's Trust

The Prince's Trust provides assistance in the form of bursaries and business mentors to young people who want to start their own business, in a wide range of areas. It anticipates helping 30,000 people to start a business in the next five years.

www.princes-trust.org.uk

Redbus Investments

Redbus exists to help new businesses – not just those based on the Internet – by taking a share in them and providing money to develop ideas into reality.

www.invest.redbus.co.uk

Training and Enterprise Councils (TECs)

These are organisations around the country that give advice and support to small businesses. There's one in most counties and large cities.

www.businesslink.co.uk

DON'T DITCH THAT DUSTER YET – 'SMART DUST' COULD SOON BE BLOWING YOUR WAY.

Byte the dust

TO MOST OF US, DUST is just a nuisance. It clogs up our PCs and spoils our houses. But there's a growing community of researchers who believe that dust could be the next big thing. The dust they have in mind, however, will be 'smart', and each tiny particle will be a fully-functioning computer.

Kris Pister of the University of California at Berkeley is leading a team whose goal is to create

devices no bigger than 1mm cubes. Each device, or 'mote', will contain sensors, an on-board computer and power supply, and an optical communication system, enabling it to talk to other motes and conventional computers.

The key to

Pister's ambition is a technology called MEMS (Micro Electro-Mechanical Systems), which permits microscopic

mechanical structures to be created using the same photo-lithographic techniques that are used to make silicon chips. Pister's current prototype device is a 5mm cube, into which is packed an amazing collection of components: a steerable laser diode transmitter, an optical receiver and passive optical transmitter, a CPU, and a battery with a solar-cell charger. In two years' time it should be possible to shrink the mote to sub-millimetre size.

The idea is that each mote is entirely self-contained, and includes an environment sensor whose data can be broadcast to other motes or an external computer. Pister's team has chosen optical communication rather than radio, because optical systems require less power. They've already demonstrated the effectiveness of the technique by monitoring a weather station that was broadcasting its data using a modified laser pointer over a rather impressive 21km distance.

As for sensors, a range of prototype motes has already been built that can monitor temperature, humidity, pressure, illumination,

spatial orientation and magnetic fields.

Currently, there's enough power on board to keep a mote in continuous operation for about a week, but this will get longer as techniques are developed for dynamically shutting down parts of the circuitry when they're not in use.

The potential of having hundreds, or even thousands, of these motes monitoring an environment is enormous. Suggested applications include 3D interaction that is truly wireless and unencumbered. With orientation-sensitive motes dusted over your fingers, your gestures could be precisely relayed to a computer, which could interpret them as commands for sculpting in virtual clay, for example, or playing musical instruments. Foodstuffs could be dusted with motes sensitive to moisture or acidity, which report when the food is past its 'best before' date.

Then there's the whole area of interfaces for the disabled. Dust could be used to precisely and unobtrusively monitor muscular movements, or to translate sign language gestures. Another possibility is to create 'smart offices', which automatically adjust their temperature and humidity in response to the requests of smart dust sprinkled on our clothing, or even our skin.

But Pister's funding comes from DARPA, the US agency for military research, so there's a strong bias towards the possible military applications of smart dust. On his web page at <http://robotics.eecs.berkeley.edu/~pister/SmartDust> Pister is understandably coy about the details of such applications, mentioning only ideas such as battlefield surveillance and Scud missile hunting.

Some technology observers have suggested more insidious uses for smart dust, especially in the realms of surveillance. Imagine a cloud of dust released into a room. Perhaps one or two of the dust particles will be smart, capable of monitoring your conversation, or even videoing you, and quietly transmitting the data to an eavesdropper who may be miles away.

Pister is philosophical about such suggested applications. 'Every technology has a dark side,' he said. 'So deal with it.' But with an almost invisible technology such as smart dust, the real problem is that you can never be sure what it is you're dealing with.



THE POSSIBILITIES FOR MOTES ARE ENDLESS... FROM SCULPTING TO TRANSLATING SIGN LANGUAGE GESTURES

TOBY HOWARD

PHOTOGRAPH PETER MENZEL

ATOMIC MANIPULATION TECHNOLOGY COULD BE THE FUTURE OF STORAGE

Up and atom

EVEN WITH THE BEST compression technology available, it is still difficult for hard disks to keep up with the sheer volume of data we are now stuffing them with from applications such as digital video editing.

The amount of data that can be stored by a disk drive is growing, but it can't keep going forever. One of the main problems with current disk-based storage technology is that, like chip

technology, designers are constantly trying to squeeze things closer together so they can

produce drives holding more data without increasing the footprint - if drive size had increased along with capacity since hard drives were

first introduced, we'd doubtless have computers with disk drives the size of merry-go-rounds attached.

Packing magnetic bits together by making them smaller and reducing the space between them is a fine plan, up to a point, but then that party-pooper mother nature steps in to spoil everything with troublesome physics laws.

As magnetic particles get smaller and closer together, they become less stable and are more prone to flip their polarity at will. If a hard drive is unstable and starts corrupting your data, then no-one will use it no matter how portable it is.

Companies are attempting to find new materials that are more tolerant of smaller magnetic particles, maintaining their reliability for longer as the capacity-to-footprint ratio increases. Nevertheless, vendors looking toward the future will eventually need to find new types of storage if they are to squeeze bulging data loads created by video and audio applications into portable devices such as Palm PCs.

IBM's work in this area mainly centres on

Atomic Force Microscopy (AFM). The company has already made great strides with atomic-level manipulation, by positioning individual Xenon atoms to write out its own name using a scanning tunnelling microscope.

Now, boffins at its research labs in California are trying to produce storage technology that could result in a storage density 100 times that of today's hard disks. The company believes that current magnetic storage densities will reach their full capacity at 20-50Gbits/in, and hopes that the atomic storage technology could push it to 300Gbit.

Significantly, IBM's technology does away with magnetism altogether. Instead, it works by placing tiny depressions and raised impressions on the surface of a plastic disk. By heating a read/write head that is 40 atoms wide, the plastic can be softened and manipulated.

The company says that the read/write head (a micromechanical cantilever) can read data back at 1.2Mbits/sec. It's not blazingly fast, but it's a good way to store all those old copies of *PCW*.

Californian company Colossal Storage is also developing an atomic-level manipulation device using ultraviolet light to manipulate electrons on a ferroelectric metal surface. The firm is hoping to push the storage envelope from 40Gbits/in up to a whopping 500. This is a big leap from current capacities of around 4Gbits/in.

One of the advantages of this technique is apparently its non-contact, read-write mechanism, which makes it possible for the stored disks to be very stable. Consequently, the company claims that the technology will offer infinite double-sided reads and writes, retaining data for at least 10 years.

The problem with both of these technologies is the investment involved. As with any innovation, it costs a lot of money to get it to the point where customers can afford it. We are therefore unlikely to see devices based on these technologies in the short term, and if they appear, they will be at the very top end of the enterprise computing spectrum.

Colossal Storage, for example, is focusing on producing products for large companies needing lots of storage attached to their networks. The frustration of running out of disk space is set to continue, at least in the short term.

DANNY BRADBURY



IBM'S MICRODRIVE MIGHT BE SMALL, BUT AFM TECHNOLOGY (RIGHT) PROMISES TO OFFER UP TO 300GBITS/IN

Easy PCs

The most powerful PC is useless if you can't find the 'on' button. 'Plug and play' usability is of key importance to the novice, so the PCW team went looking for a PC that's as easy as A B C...

For most of you reading this, the millennium has been and gone, you've done the partying, got the hangover and broken your resolutions. The famous millennium bug has either reared its ugly head and caused a global meltdown, or reached an anti-climax.

We're assuming the latter, and that if you put off buying a new PC until the new year you are now ready to take the plunge. We've targeted the PC novice – those who thought they'd play safe and wait until 2000 to buy a new system.

In judging the systems, we focused heavily on the out-of-the-box experience. We tried to put ourselves into the shoes of the inexperienced user and asked ourselves how easy it was to put the PC together – for example, had the manufacturer supplied us with an easy-to-read wall chart, and were the peripherals correctly colour-coded?

We set a price limit of £999 ex VAT, but including delivery and any credit card surcharge. The manufacturers were given a minimum specification of 128MB of RAM, a must in any new PC, as well as a DVD drive. We also asked for a modem, an office suite and at least a 17in monitor, but we left the choice of processor open.

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• PCs reviewed by Will Head and Jason Jenkins.
Tested by David Eade, Will Head and Jason Jenkins.

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended



Atlas Meridian A500W

Atlas pulled out all the stops with an impressive machine that nearly wins an award, but misses out due to a lack of attention to detail. The core of the system, a 500MHz Athlon processor, is a fair compromise between value and performance. 128MB of RAM sits in a single DIMM on the MSI motherboard.

One component that really stands out is the excellent

17in CTX Professional 705F monitor. The Sony Trinitron tube is clear and crisp: you could stare at it for hours without feeling tired.

Build quality is fairly good, although Atlas has made an error that could cause a few technical support calls: there was no CD audio cable on our system. Another annoying aspect is the by-now familiar hole in the back plate for a fan with nothing in front of it.

The only poor component choice was the Guillemot TNT2 M64 graphics card that is crippled by its slower memory interface. An Aureal Vortex 2 with an optical digital out port sits in a PCI slot along with a Diamond SupraExpress modem.

A good selection of drives are included: a 13.5GB IBM Deskstar hard drive, Panasonic Zip 100 for backup and a Hitachi DVD-ROM for your films and software.

If a novice tried to set up this machine on their own,

they may find it slightly more difficult than other PCs here. There's no wall chart as in other systems and the peripherals are not colour-coded. This shouldn't be much of a problem, though, as Atlas is one of the few manufacturers that supplies an engineer who comes out and installs and configures the machine for you.



PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Atlas 07000 285 275

www.atlasplc.com

Good points Excellent monitor, Zip drive and installation engineer included

Bad points Lack of CD audio cable, graphics card

Conclusion A well-rounded system that just misses out on an award this time

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Big Red Phantom

Big Red supplied us with a machine based on the 500MHz Athlon processor which, once again, produced a higher SYSmark score than equivalently clocked Pentium IIIs. This, combined with a Voodoo3 3000 graphics card with an S-Video port, meant that it achieved a reasonable 3DMark score as well.

The cheaper of the two current SoundBlaster Live! cards, the SoundBlaster Live! 1024, sits in a PCI slot.

128MB of memory fills a single socket on the MSI motherboard. The 15.2GB IBM Deskstar hard drive is slightly larger than others in this test and will be ample for most users. The 17in shadow mask E771 Viewsonic monitor is, once again, a fairly solid choice, although there are better models here. A Panasonic DVD-ROM and Rockwell modem complete the setup.

Build quality is generally good, but we were a bit concerned about the choice of case. Although some may appreciate the individual look that the black plastic surround gives this unit, the inside was not so cool. When we opened the case after running the machine for a few days, the inside was exceptionally warm which may cause problems.

Big Red did not give us the best out-of-the-box experience. The company opted for a three-page A4

document rather than a wall chart to guide novices through the setup process.

We found the layout a bit dense and the language too technical for some users and none of the peripherals were colour-coded. Overall the Phantom is a fair machine, but other manufacturers have provided us with systems more suited to first-time buyers.



PCW DETAILS

Price £1,173.83 (£999)

Contact Big Red 08700 711 117

www.bigred.co.uk

Good points Appropriate combination of graphics card and processor

Bad points Lack of removable storage case

Conclusion A fair system, but not one that we would recommend for the novice

Build Quality	★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★

Carrera Octan M600

Carrera provided a blisteringly fast Athlon 600MHz, but once again crippled the chip's 3D performance by using a TNT2 M64 graphics card. If you're paying for a fast processor, you should have a fast graphics card too, or you're wasting your money. Aside from that, Carrera has chosen some good components.

A basic Aureal sound card sits in a PCI slot. This version doesn't have an optical digital out port, but it does support A3D. Inside the case, the most unusual feature is the Asus K7M motherboard, although the VIA chipset doesn't appear to have given this machine any discernible performance boost in our bench tests. The E-Tech modem has a useful pass-through port for your phone to plug in to.

The 13.5GB IBM Deskstar hard drive supports UDMA66 and should be large enough for most users. A Panasonic DVD-ROM sits in a 5.25in bay, leaving a further three free. The 17in Hansol 710A shadow mask monitor also makes a reappearance. It has an adequate display but could be both clearer and crisper.

Build quality is up to Carrera's high standards, with plenty of room for

upgrading. The office bundle is the competent Lotus SmartSuite Millennium.

Carrera's machine was not the best when it came to easy installation. The keyboard, mouse, leads and software were in separate boxes, there was no wall chart and only the mouse was colour-coded. This is a good system, but it doesn't quite gel for the novice user.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Carrera 020 8307 2811
www.carrera.co.uk

Good points *Fast processor, good build quality*

Bad points *Graphics card, monitor could be better*

Conclusion *A fair system, but a novice user would have an easier time with another manufacturer*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Compaq Presario 5476

Compaq has decided to opt for a super-curve design for the new Presario range. Unfortunately we weren't particularly enamoured with it, but it'll no doubt appeal to some people.

Discounting the design of the case, it does offer some good features. On the front you'll find two USB ports, in addition to the two on the back, as well as a joystick port, which is clever thinking as no-one enjoys fumbling

around the back of a PC. On the downside, the case offers limited upgradability, with only two free 3.5in bays, and the hard drive bizarrely mounted in a 5.25in bay.

The heart of the machine is a 500MHz Celeron processor combined with 128MB of RAM. This base spec, coupled with an on-board graphics solution saw the Presario coming last in both the SYSmark and 3DMark results.

The machine has adequate storage on the 10GB Quantum hard drive, but no removable storage.

The keyboard features 'Internet' keys, similar to Microsoft's new range of keyboards, allowing one-key access to the web.

In addition, there are keys to control audio CDs and a sleep button thankfully placed well away from the rest of the keyboard so you don't accidentally

put the machine in a doze.

Pioneer supplies the DVD-ROM, with sound coming from an on-board solution piped into a set of JBL Pro speakers. The out-of-the-box experience was good – the whole system arrived in just two boxes, all connectors were colour-coded and the quick setup sheet was simple and easy to follow.

PCW DETAILS

Price £999 (£850.21 ex VAT)

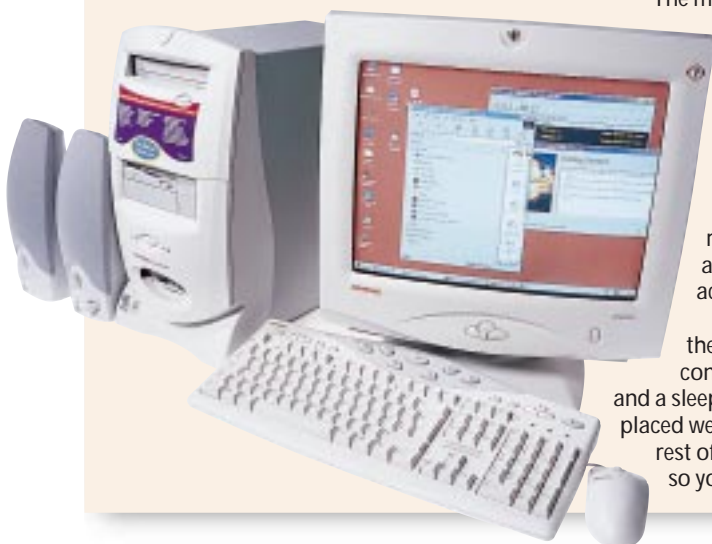
Contact Compaq 0845 270 4000
www.compaq.co.uk

Good points *Very easy to set up. USB and game ports on front*

Bad points *Under-powered for the price. On-board sound and graphics*

Conclusion *While power is less of an issue here there are better machines available for the money*

Build Quality	★★★★
Performance	★
Value for Money	★★★★
Overall Rating	★★★



Dan Dantum Cel500/NU

Dan decided to opt for a 500MHz Celeron processor with 128MB of RAM for its first-time buyer offering. It gains points for upgradability as the Celeron has been mounted on a 'slocket', allowing the processor to be replaced with a Slot 1 CPU such as the Pentium III at a later date without having to replace the motherboard.

In terms of performance, the Celeron was no match for the Pentium IIIs and Athlons, but it is still adequate for the first-time buyer. Although Dan chose a dual-head Matrox Millennium G400 card, the benefit in the 3DMark results was not seen due to the slower processor. While the dual-head functionality would be a benefit to the power user, it's unlikely to be used by a novice. That said it's still a great inclusion.

Creative's components have been put to work in the multimedia department, with SoundBlaster PCI 128 and a six-speed DVD-ROM. The Jazz Studio speakers included with the machine were an unusual 'ocean blue' colour, but unfortunately did not match the translucent purple of the system box and mouse, making the whole package look a bit of a mismatch. Dan has assured us the unit was meant to arrive with purple speakers.

The out-of-the-box experience could have been

better. The step-by-step sheet was good, but only once we'd found it under everything else in the box. The system featured no colour-coding for plugs.

Under the hood, the layout was neat with all the cables routed tidily out of the way. On the software side, Dan has taken the Lotus route, bundling SmartSuite Millennium for the office productivity side of things.

PCW DETAILS

Price £1,050.45 (£894 ex VAT)

Contact Dan Technology

020 8830 1100

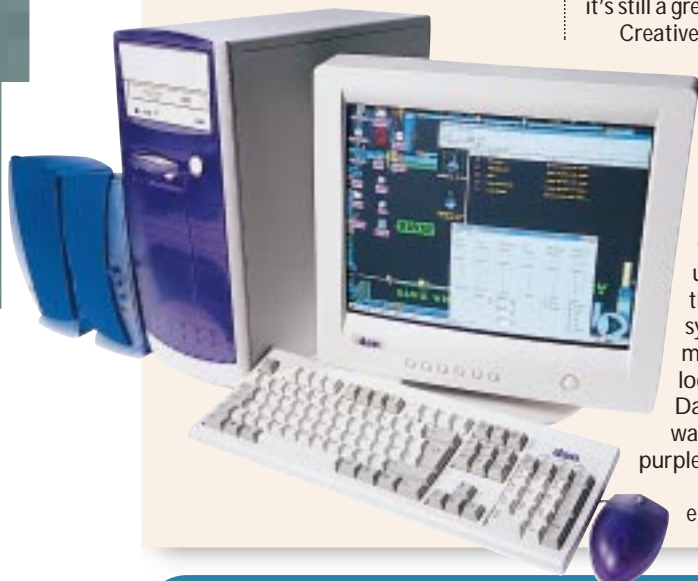
www.dan.co.uk

Good points Good graphics card

Bad points Setup could have been easier

Conclusion Not the most suitable machine for the first-time buyer, but it has some good features

Build Quality	★★★★
Performance	★★
Value for Money	★★★★
Overall Rating	★★★



Dell Dimension XPS T500



Setting up the Dell was an absolute breeze. Open the box and the first thing you encounter is an easy-to-follow leaflet with instructions about what goes where. After extracting the case, monitor and peripherals the job was made even easier due to the colour-coding on all the connectors.

For the first-time buyer this

sort of ease of use is essential.

In terms of specification the machine was adequate, comprising a 500MHz Pentium III processor and 128MB of RAM. 13GB of storage came courtesy of a Maxtor hard drive, but unfortunately there was no removable storage.

3D performance from the Diamond Viper V770 card, using nVidia's Riva TNT2 chipset, saw the Dell in the middle of the 3DMark group. The output of the card was sent to a Dell-branded 17in monitor. A Samsung eight-speed DVD-ROM and Creative's SoundBlaster Live! Value provided multimedia with proficient sound reproduction from the Harmon Kardon HK195 speakers, complete with colour-coded cable. As well as a US Robotics V.90 modem, the Dell comes with an HP DeskJet 610 printer which provides plenty of functionality for the first-time user. Topping off the bundle was a copy of Microsoft Works Suite 99.

While the Dell machine was not the most feature-packed or fastest on test, all the components were well considered and appropriate for the

first-time buyer. To the uninitiated, setting up a PC can be a daunting prospect, but the process has been made as simple as possible. In terms of simplicity and ease of use the Dell was second to none, resulting in a well-deserved Editor's Choice award.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Dell Computers

0870 152 4850

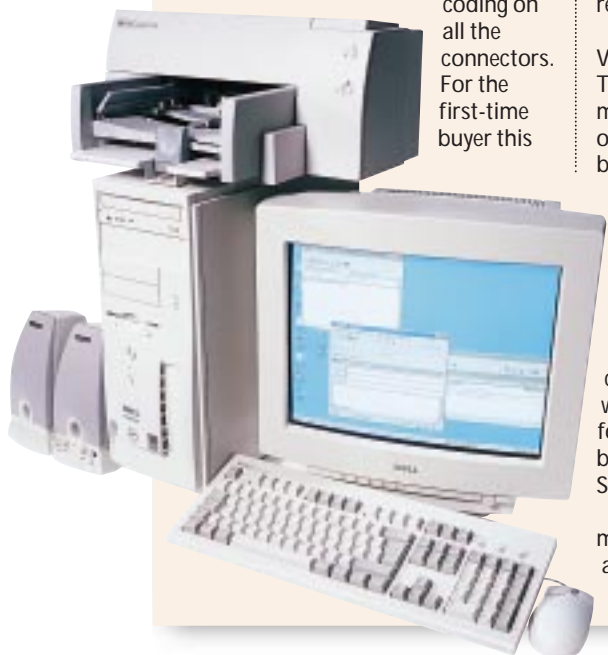
www.dell.co.uk

Good points Colour-coding on all peripherals. Well considered components

Bad points Not the fastest machine in the test

Conclusion Dell has obviously considered the target market for this machine and put together a bundle that's perfect for the task at hand

Build Quality	★★★★★
Performance	★★★
Value for Money	★★★★★
Overall Rating	★★★★★



Elonex WebRider

Quite why Elonex has chosen to call this machine the WebRider is a mystery, as we can see no reason why it 'rides' the web better than any other machine with a modem. The core of the system is a 500MHz Pentium III and 128MB of SDRAM, placing it in the middle of the field in terms of performance.

Unpacking the Elonex was simple enough, and we were initially pleased to see a 'step-by-step' sheet to guide

the first-time user through setup. Unfortunately, the content of the sheet was a little advanced, referring to ECP parallel ports, AT keyboards (even though the WebRider had a PS/2 model) and was dripping with jargon. However, this shouldn't be a problem, as the price includes onsite installation by an engineer.

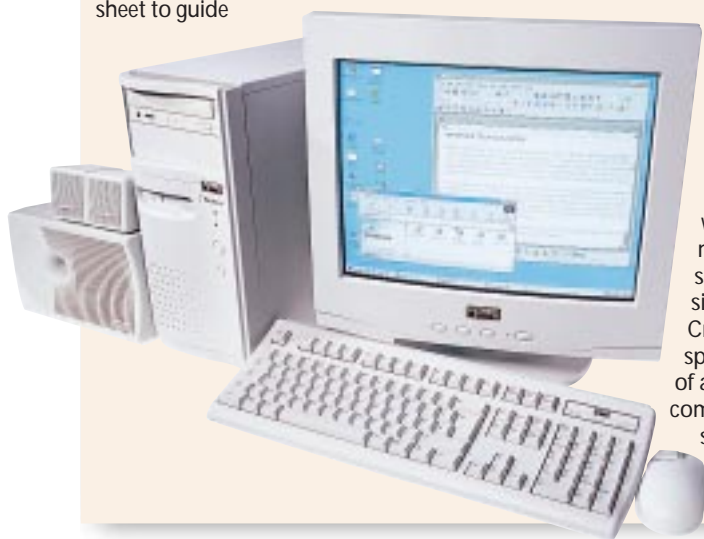
Graphics come from a Winfast TNT2 model 64-based card connected to an Elonex-branded 17in monitor. The use

of a model 64 saw the Elonex sitting in the middle of the group again on 3D performance.

Multimedia takes the form of a Sony six-speed DVD-ROM, with an integrated motherboard sound solution supplying the signal for a set of Creative PC Works speakers. The inclusion of an LS-120 drive was commendable, providing simple and easy backup for the non-technical user. To

justify its name, the WebRider features a 56K US Robotics internal modem.

The small case meant things were cramped and upgrade potential was limited. This may appear unimportant to the first-time buyer, but it could be a problem if they later decided to upgrade. On the software front, a copy of MS Office 2000 SBE was included, adding significant value to the package.



PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Elonex

0800 037 4466

www.elonex.co.uk

Good points LS120 drive. Microsoft Office 2000 SBE

Bad points Poor set up sheet

Conclusion A fair machine that just slightly missed the mark

Build Quality	★★★
Performance	★★★
Value for Money	★★★★★
Overall Rating	★★★★

Evesham 500 Athlon TNT2

The 500MHz Athlon processor coupled with 128MB of SDRAM saw the Evesham sitting around the middle of the SYSmark results. Included in the package was a whopping 20GB hard drive from Maxtor, providing more than ample storage, and a 100MB internal Zip drive to safeguard important files. In terms of removable storage, the Zip drive is ideal for the first-time user due to its simple operation and widespread adoption.

3D performance was a little disappointing, mainly due to use of a TNT2 model 64 card, which fails to deliver impressive graphics acceleration, but again this is less of an issue for the first-time buyer. Creative has been chosen for the multimedia peripherals, providing the SoundBlaster 128 PCI sound card, CSW52 speakers and a five-speed DVD-ROM drive.

The machine offered limited upgradability, with only single free 3.5in and 5.25in bays. Inside, the layout was extremely tidy with all the wires

neatly tied back and secured. Should the buyer to decide to have a go at upgrading in years to come there will be no nasty surprises.

Evesham has unfortunately missed out on the colour-coded peripherals, with only the mouse exhibiting any colouring at all. The out-of-the-box experience was good, but could have

been better. The manuals were arranged somewhat randomly in the box containing the system. Once these were located the 'Read this first' card was useful, with a step-by-step flow chart to guide the new user through the setup procedure.

On the whole Evesham provided a solid contender that was only let down in a couple of areas.



PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Evesham Micros

0800 038 0800

www.evesham.com

Good points Good set up sheet Zip drive

Bad points No colour-coding

Conclusion A good machine that doesn't quite make it easy enough for the first time buyer

Build Quality	★★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

Gateway Performance 500



Gateway has tried to simplify the out-of-the-box experience, and the simple setup sheet was comprehensive and well targeted at the first-time buyer. The machine itself featured colour-coded peripherals, which makes setup less of a struggle for the inexperienced PC buyer.

The machine is based on a 500MHz Pentium III processor with 128MB of RAM sitting

in one of the three available DIMM slots. SYSmark results did not see the system excel, but this is less of a factor in this group test. A 16MB Voodoo3 graphics card yielded better 3D performance, pushing the Gateway further up the field. The 17in monitor was a Gateway-branded model providing an adequate display. But the IBM hard drive provided only 6GB of storage, which is a little small by today's standards, and no removable storage option was included.

A Panasonic DVD-ROM has been chosen, along with a Creative SoundBlaster 128 sound card and Creative's Cambridge Soundworks GCS200 speaker system. The system case provides ample upgradability, but unfortunately the floppy bay takes up the same amount of space as a 5.25in bay which is wasteful and looks unsightly.

Inside the PC, the wires were a bit of a

mess, with the DVD audio cable being used to tie up the power cables. In general, the Gateway offers good setup and ease-of-use, but it is let down in other areas. That said, if you're looking for an easy-to-set-up first PC with a solid spec, the Gateway is definitely worth a look.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Gateway
0800 552000

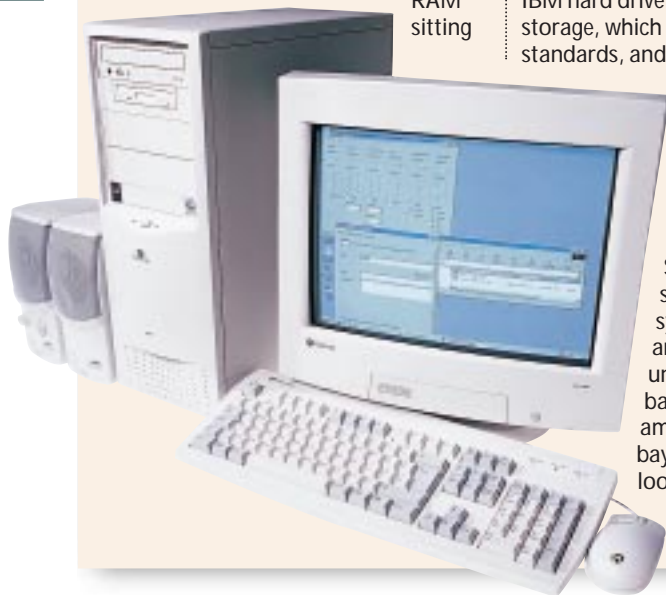
www.gw2k.co.uk/

Good points Easy to set up. Colour-coded peripherals

Bad points Small hard drive. Un tidy inside

Conclusion The hard disk may be small but the ease of use wins through

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Lexon Ultima 702

Lexon submitted the fastest Intel chip in this group test, in the form of a 600MHz Pentium III. The CPU was coupled with 128MB of SDRAM and was only beaten by the 600MHz Athlons from Panrix and Carrera. However, power is not the main focus of this group test as we were more interested in a machine's suitability for the first-time buyer.

Out of the box, Lexon could have done better. There was no quick-start sheet to walk you through the basics, with the

documentation and software in a padded bag stuffed down the side. The peripherals were not colour-coded, which can significantly hinder the uninitiated in setting up a new PC. Unfortunately, the review machine that arrived in our labs had no monitor cable in any of the boxes.

Graphics came from a 32MB Diamond Viper V770, based on the Riva TNT2 chipset, and resulting in the Lexon sneaking to the top of the 3DMark results. To make use of this fine graphics

card, the impressive LG Flatron 795FT plus monitor has been employed. The monitor also includes a USB hub, located at the rear of the unit which limits its usefulness.

Sound comes courtesy of Creative's PCI 128 card and a set of Labtec's LCS-1030 speakers, with colour-coded plugs to match the sound card's output. Not necessarily appropriate for the first-time buyer, Lexon chose to bundle a Mitsumi CD-RW

with the machine whereas a Zip or LS-120 would be more user-friendly.

On the software side, Lexon has generously opted to include Office 2000 Professional – the premium productivity suite – which will let the user delve into its intricacies as their knowledge increases.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Lexon Technology
01442 241 700

www.lexonpc.com

Good points Fast machine. Quality components. Office 2000 Professional

Bad points Set up could have been easier. Some of the components were not the best choice for the first-time buyer

Conclusion A good machine for the more experienced user, but poorly targeted at the first-time buyer

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Mesh Matrix 500 Pro

Mesh chose to base its system on a 500MHz Athlon and 128MB of RAM, putting it just above the middle of the group in the SYSmark results. The 13GB Quantum hard drive is thoughtfully coupled with an internal Iomega Zip 100 drive to provide simple and easy backup and transport of files. Unfortunately, the Zip drive is mounted in a 5.25in bay, with an external 3.5in bay being left vacant below.



3DMark results saw the machine lower down, due to the use of a Creative Riva TNT2 model 64-based card. Mesh's generous offering of a Mitsubishi Diamond Pro 710 17in monitor produced a display that was a joy to work with and should raise few complaints.

A Pioneer DVD-ROM and SoundBlaster Live! 1024 have been employed on the multimedia front with four-point surround speakers also from Creative. While four-point surround is a good feature, it is a bit of a pain to set up, especially for the first-time buyer. Completing the hardware side of things, a Diamond SupraExpress V.90 modem provides the connection to the Internet.

Out of the box, Mesh scored well for including a folder containing all the software and manuals, but lost a

point for not including a quick setup sheet. That, coupled with the lack of colour-coded peripherals meant the Mesh wasn't the easiest to set up.

Inside the case everything was neat and tidy with two free 3.5in bays and one 5.25in on offer for future expansion. Topping off the package was a copy of Corel's Word Perfect Office 2000.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Mesh Computers

020 8208 4706

www.meshplc.co.uk

Good points Quality monitor. Zip drive

Bad points Could have been easier to set up

Conclusion While the machine was good, it was not especially well targeted at the first-time buyer and it was more suitable for someone with a bit more experience

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Panrix Force



Full marks to Panrix for being one of the few manufacturers to choose a suitable graphics card to accompany a fast processor. The 600MHz Athlon processor, together with a 32MB single-head Matrox Millennium G400 graphics card meant this machine was near the top for SYSmark and 3DMark results.

In common with Carrera, Panrix has opted for an Asus K7M motherboard that uses the VIA chipset. This version,

however, has VIA's on-board sound solution. Build quality is exceptional, with two fans mounted on the processor that should prevent any overheating issues. A Samsung SD-606F DVD drive lets you watch smooth-playing DVDs using the Cinemaster PowerDVD player that comes bundled with the graphics card. The 17in Hitachi CM650ET monitor is a fairly good shadow mask model and a pair of basic Labtec speakers are also included. A

Diamond SupraExpress modem and Lotus SmartSuite Millennium complete the round-up.

Panrix is a strong contender for the best out-of-the-box experience, although Dell and Gateway have the edge. The keyboard, mouse and leads were placed in a box at the top of the case. A wall chart shows

you how to get started in six easy steps, although it reminded us of the diagrams you see included with Ikea furniture. However, there was no colour-coding on the peripherals or monitor cable.

Despite these gripes, it remains a good, well-rounded system and deserves its Highly Commended status.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Panrix

0113 244 4958

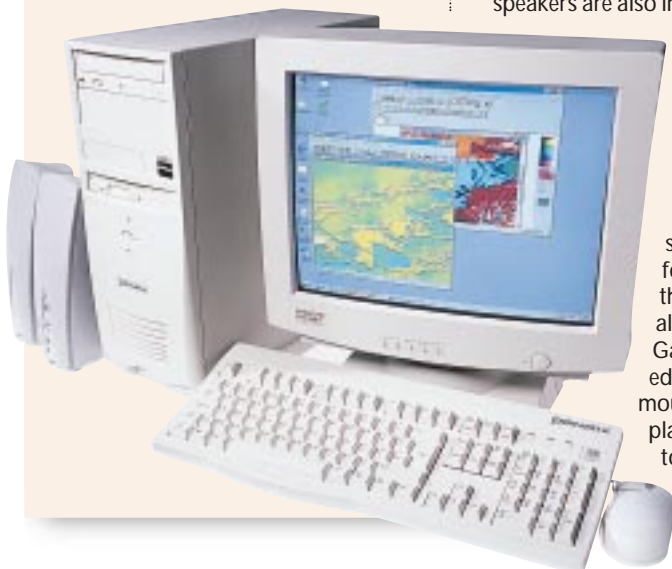
www.panrix.com

Good points Fast processor and graphics card

Bad points No removable storage

Conclusion A well-rounded system that is not quite as easy to set up as Dell and Gateway's PCs, but is still good enough to win a Highly Commended

Build Quality	★★★★★
Performance	★★★★★
Value for Money	★★★★
Overall Rating	★★★★★



Simply Systemax Pro 500

Simply gave us a good system that comes bundled with a basic Canon printer and scanner. A parallel port expansion card is situated in an ISA slot to avoid any bi-directional problems associated with pass-through ports.

Built around a Pentium III 500MHz processor, this machine produced slightly higher-than-average benchmark scores. The 128MB of RAM is housed in a single DIMM, leaving two

memory slots free on the AOpen motherboard. A single-head 16MB Matrox Millennium G400 graphics card sits in the AGP slot and helps the Systemax to score fairly well on 3DMark.

The Aureal Vortex 2 sound card is an excellent choice. Its optical digital out port together with A3D support gives you maximum flexibility and high-quality sound.

The office suite is the latest version of Works, Worksuite 2000. This is adequate for the majority of users, but is not as fully featured as Lotus SmartSuite Millennium or Microsoft's Office 2000.

A 13GB Fujitsu hard drive provides a fair complement of storage capacity, while a Pioneer DVD-ROM drive lets you watch movies smoothly with the supplied MPEG2 player.

The Systemax was slightly easier than others to set up out of the box. All the software, cables and so on were at the top of the box together with a wall chart. Having said that, we didn't feel the language used in the wall chart was

appropriate for the novice user and was more likely to confuse than actually help.

The 17in Taxan Ergovision 735 TCO99 monitor is Taxan's lowest-end 17in shadow mask monitor, but the display is still both clear and crisp and it has a four-port powered USB hub located in its base.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Simply Computers
08707 297 366

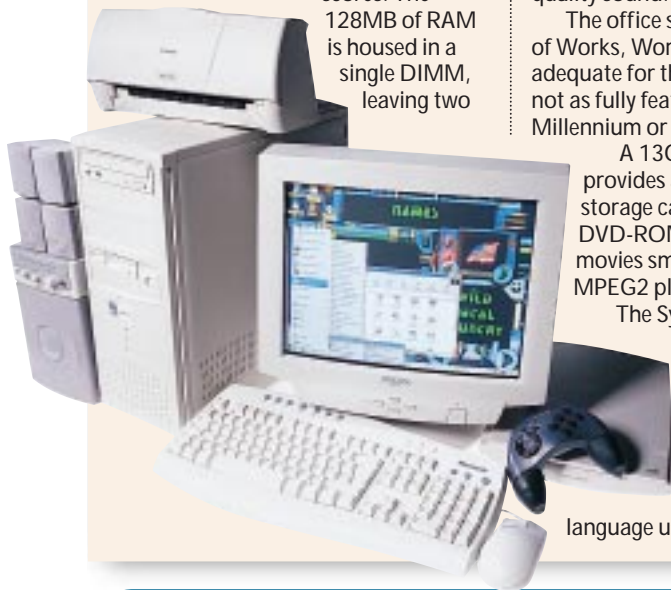
www.simply.co.uk

Good points Sound card, monitor, scanner and printer included

Bad points No removable storage, could have a better wall chart and office suite

Conclusion A good system that only just loses out to the competition

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



SMC Direct Infinite DVD Gamer

This is the first time we have seen a system from SMC, and it's a fairly promising debut, although it doesn't win any awards. The core of this unit is a Pentium III 450 processor which, although adequate for most office tasks and watching DVDs, helps it to score one of the lower SYSmark results here. Having said that, the 16MB Matrox Millennium G400 graphics card is a good

choice. It's interesting to note that this card helps it beat other machines with faster processors in our 3DMark tests.

The monitor is also a good choice. The 17in DiamondTron Iiyama Vision Master Pro 410 has a clear, crisp display and will refresh at 70Hz at 1,600 x 1,200. Importantly, build quality is good, with a tidy interior. The 10.2GB Maxtor hard drive is a slightly measly choice, but will still be more than adequate for the majority of users. The

keyboard and mouse both deserve a mention: the mouse uses the excellent new IntelliEye from Microsoft which uses an optical sensor rather than a roller ball. Microsoft's Internet Keyboard is a solid choice and has additional buttons that speed up web surfing.

Lotus SmartSuite Millennium is a good office bundle, and the SoundBlaster Live! 1024 is a popular choice. The keyboard, mouse and software were all in a box

at the top of the case, together with a booklet on how to put your PC together.

There was no wall chart as with other machines. The keyboard and mouse were correctly colour-coded, but the monitor was not. Overall this is a good first system from SMC, but there are better buys for the uninitiated.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact SMC Direct
01753 550 333

www.smcdirect.com

Good points Monitor and graphics card

Bad points We would have liked to have seen a faster processor and better instructions for the novice

Conclusion A promising debut from SMC, but it doesn't win any awards this time

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Viglen HomePro P3-500Fw

Based on a Pentium III 500MHz processor, this machine came mid-table in our SYSmark bench test. The most unusual component in it was ATI's new card, the Rage 128 Pro. This is the card's first appearance in one of our group test PCs and it certainly appears to be fast, but not as fast as the TNT2 Ultra. This version had S-Video out, composite out and composite in ports.

The system came with ATI's multimedia centre

pre-loaded, through which you can play DVDs and video CDs, watch TV and even do some video editing.

A Pioneer DVD-ROM, 128MB of RAM in a single DIMM and a US Robotics modem are all decent component choices. There's also a SoundBlaster Live! 1024 card in a PCI slot that has a digital out port for compatible speakers. A Panasonic LS-120 drive is housed in a 3.5in bay and combines maximum compatibility with high-capacity media.

The ADi E55 monitor is not one of the best here, but it is decent enough. Build quality, though, is excellent. As you would expect from a manufacturer that has been established this long, Viglen's out-of-the-box effort was not at all bad, but it was not quite

up to the high standards of Gateway or Dell. The mouse, keyboard, cables and manuals were all in a box at the top of the case together with a good wall chart to get novices going. The mouse and keyboard were colour-coded, but the monitor was not.

Overall, a good all-rounder from Viglen which is most notable for the first appearance of ATI's new graphics card.

PCW DETAILS

Price £1,173.83 (£999 ex VAT)

Contact Viglen 020 8758 7000

www.viglen.co.uk

Good points The inclusion of a removable storage device

Bad points Could have a better monitor

Conclusion A good system, but there are slightly better buys here for the novice

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★



Creative tunes up sound cards

Not content with inventing the standard to which all other sound cards must comply, Creative has been hard at work refining its successful range of SoundBlaster Live! cards, resulting in the introduction of two new cards: the SoundBlaster Live! Platinum, replacing the original Live!, and the SoundBlaster Live! Player 1024, replacing the Live! Value. The Platinum is aimed at the high end of the market, with the Player 1024 satisfying the needs of the average user.

Previously if you bought the Live! Value and then decided that you needed or wanted the functionality of the full Live! there was no upgrade option available other than ditching the old card and purchasing the full version. This has all changed now as the main difference between the Platinum and the Player 1024, except the bundled software, is that the Platinum comes with the Live! Drive II which sits in a 5.25in drive bay and connects to the extension port on the card. The Live! Drive II offers digital input and output as well as analog connectors.

The Player 1024 features the same EMU10K1 digital signal processor from E-mu Systems as the original. On the input side of things you'll find line and microphone in on the back of the card

with internal connectors for a modem, auxiliary device, audio CD-ROM and SPDIF digital CD-ROM. Output takes the form of two analog line outs and a

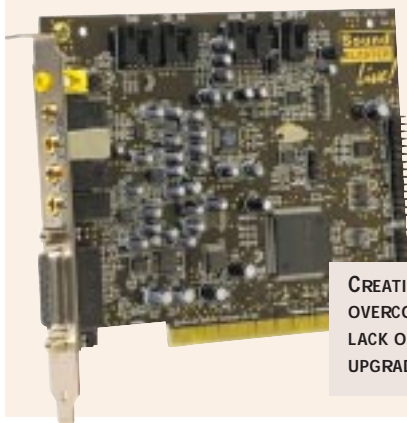


PLAYER 1024 IS AIMED AT THE AVERAGE USER

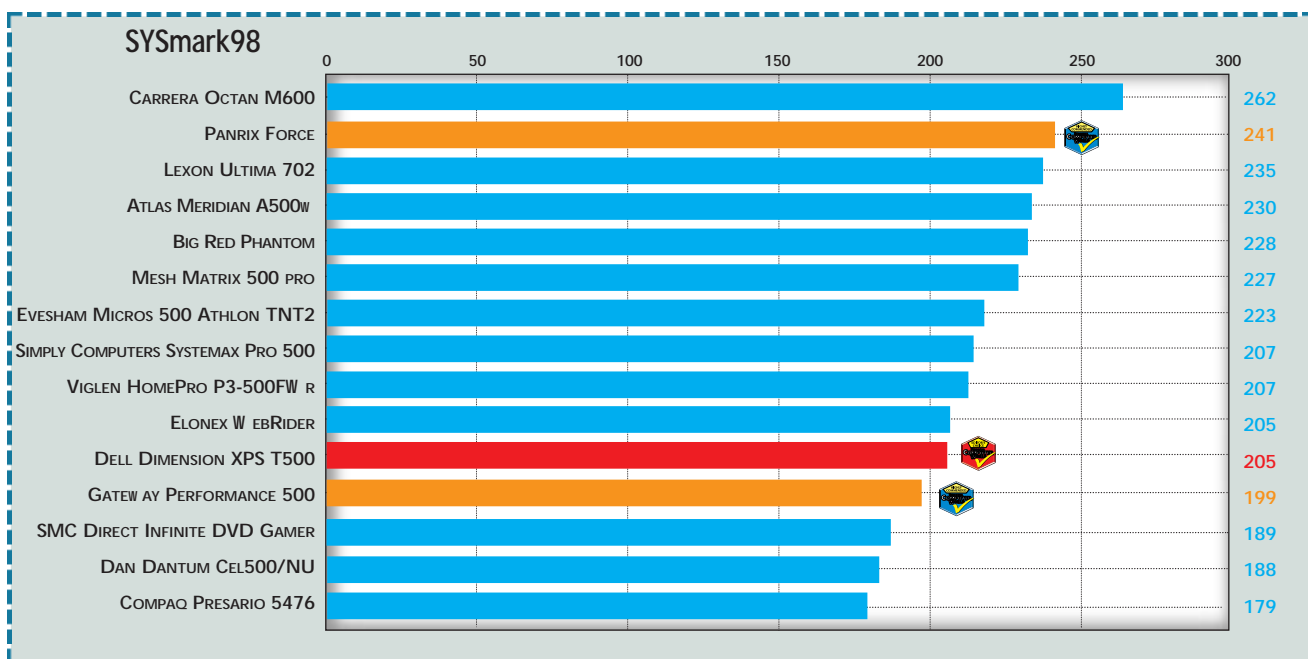
digital out jack, suitable for connection to Creative's range of

digital speakers.

The bundled software covers a very broad range of applications. There's a full copy Aliens vs Predator for the gaming fans. For those who want to manipulate recorded music there's Creative's PlayCenter, AudioHQ, WaveStudio and Digital Audio Centre. And for those that enjoy working with a talking parrot flying around their screen, there's Prody the virtual assistant. In the box you'll also find copies of LAVA! (Live! Audio Visual Animation), MediaRing Talk and Soft DVD.



CREATIVE HAS OVERCOME THE LACK OF UPGRADABILITY



How we did the tests



■ **SYSmark** measures the time it takes a PC to perform tasks in 14 common office and content-creation apps. Each test is run three times to ensure consistency. Tests include:

➤ **Office productivity:**

CorelDraw 8, Excel 97, NaturallySpeaking 2.02, Netscape Communicator 4.05, OmniPage Pro 8.0, Paradox 8, PowerPoint 97 and Word 97.

➤ **Content creation:**

MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia

Extreme 3D 2, Photoshop 4.01, Adobe Premiere 4.2, and XingMPEG Encoder 2.1.

■ **3DMark99 Max** is an instruction-set optimised version of 3DMark99 from Futuremark Corporation, which tests the 3D capabilities of PCs. When applicable, the suite of tests will draw on AMD's 3DNow! or Intel's KNI instruction sets. It uses a Real World DirectX 6.1 3D game engine to produce one result from a balanced testing methodology that includes image quali-

ty, rendering speed, CPU capability and, depending on hardware support, a test for embossed bump-mapping. All tests are performed at 1,024 x 768 resolution in 16bit colour depth with the test suites set to loop three times. The higher the score, the better the result. However, due to the implementation of instruction-set optimisation, the results from the original 3DMark99 and the Max version are not comparable. See www.3dmark.com.







Table of features



MANUFACTURER	ATLAS	BIG RED	CARRERA	COMPAQ	DAN	DELL	ELONEX
MODEL NAME	MERIDIAN A500W	PHANTOM	OCTAN M600	PRESARIO 5476	DANTUM CEL500/NU	DIMENSION XPS T500	WEBRIDER
Price (ex VAT)	£1,173.83 (€999)	£1,173.83 (€999)	£1,173.83 (€999)	£999 (€824.18)	£1,050.45 (€894)	£1,173.83 (€999)	£1,169.13 (€995)
Telephone	07000 285 275	08700 711 117	020 8307 2811	0845 270 4000	020 8830 1100	0870 152 4850	0800 037 4466
Fax	020 8532 6517	08700 733 337	020 8307 2850	0845 270 4100	020 8830 1122		020 8452 7444
URL	www.atlasplc.com	www.bigred.co.uk	www.carrera.co.uk	www.compaq.co.uk	www.dan.co.uk	www.dell.co.uk	www.elonex.co.uk
HARDWARE SPECS							
Processor	Athlon 500MHz	Athlon 500MHz	Athlon 600MHz	Celeron 500MHz	Celeron 500MHz	Pentium III 500MHz	Pentium III 500MHz
RAM/Type	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
Occupied RAM slots/spare RAM slots	1/2	1/2	1/2	1/1	1/2	1/2	1/1
Max memory in this configuration	640MB	640MB	640MB	384MB	640MB	640MB	384MB
Max memory supported by motherboard	768MB	768MB	768MB	512MB	768MB	768MB	512MB
Hard disk (manufacturer & model)	IBM Deskstar	IBM Deskstar	IBM Deskstar	Quantum	IBM Deskstar	Maxtor DiamondMax	Fujitsu AT
HD size/interface	13.5GB/EIDE	15.2GB/EIDE	13.5GB/EIDE	10GB/EIDE	13GB/EIDE	13.6GB/EIDE	13.6GB/EIDE
Storage drive model & manufacturer	Panasonic Zip	n/a	n/a	n/a	n/a	n/a	Panasonic LS-120
Size of storage drive media	100MB	n/a	n/a	n/a	n/a	n/a	120MB
Storage drive interface	IDE	n/a	n/a	n/a	n/a	n/a	IDE
MOTHERBOARD COMPONENTS							
Motherboard manufacturer	MSI	MSI	Asus	Compaq	Supermicro	Intel	MSI
Model/chipset	AMD	AMD	VIA	810	BX	BX	ZX
L2 cache	512K	512K	512K	128K	128K	512K	512K
EXPANSION AND I/O							
No of 3.5/5.25in bays	4/3	3/3	3/4	3/2	4/2	5/2	3/2
No of free 3.5/5.25in bays	1/3	1/2	1/3	2/0	2/1	3/1	1/1
No of PCI/ISA/shared slots	4/1/1	4/1/1	4/0/1	4/0/0	3/2/1	4/0/1	2/0/1
No of free PCI/ISA/shared slots	2/1/1	2/1/1	2/0/1	3/0/0	2/1/1	2/0/1	1/0/1
No of USB/serial/parallel/PS2	2/2/1/2	2/2/1/1	4/2/1/2	4/1/1/2	2/2/1/2	2/1/1/2	2/2/1/2
MULTIMEDIA							
DVD-ROM manufacturer	Hitachi	Panasonic	Matsushita	Pioneer	Creative	Samsung	Sony
DVD-ROM speed/interface	6x/EIDE	6x/EIDE	6x/EIDE	6x/EIDE	6x/EIDE	8x/EIDE	6x/EIDE
Sound card manufacturer	Aureal	Creative Labs	Aureal	ESS Tech	Creative Labs	Creative Labs	Creative Labs
Sound card model	Vortex 2	SB Live! 1024	Vortex AU8830	On-board	SB 128 PCI	SB Live! Value	On-board
Speakers (manufacturer & model)	Diamond DPM-2012	3D 103	Altec Lansing ACS43	JBL Pro	Jazz Studio	Harmon Kardon HK195	Creative CSW 100
Graphics card manufacturer & model	Guillemot 32MB	3dfx Voodoo3 3000	Guillemot TNT2 M64	On-board	Matrox G400	Diamond Viper V770	W infast S320 TNT2
Chipset	Riva TNT2 M64	Voodoo3	Riva TNT2 M64	Intel 810	G400	Riva TNT2	Riva TNT2 M64
RAM/max RAM and type	32MB/32MB/ SDRAM	16MB/16MB/ SDRAM	32MB/32MB/ SDRAM	16MB/128MB/ SDRAM	16MB/16MB/ SDRAM	32MB/32MB/ SDRAM	32MB/32MB/ SDRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP	AGP	AGP
Monitor manufacturer & model	CTX PR 705F FD Trinitron	Viewsonic E771	Hansol 710A	Compaq MV720	CTX/VL700	Dell M770	Elonex 17in SVGA
Monitor size/max viewable diagonal	17in/16in	17in/16in	17in/16in	17in/16in	17in/15.9in	17in/16in	17in/16in
Max resolution and refresh	1,600x1,200/67Hz	1,280x1,024/66Hz	1,280x1,024/60Hz	1,280x1,024/60Hz	1,280x1,024 /60Hz	1,280x1,024/60Hz	1,280x1,024/60Hz
OTHER INFORMATION							
Modem manufacturer & model	Diamond Supra 56K	Rockwell 56K	E-tech 56K	Diamond Supra 56K	MRI/56K Internal	US Robotics 56K	US Robotics 56K
Highest supported modem standard	V.90	V.90	V.90	V.90	V.90	V.90	V.90
Misc hardware	None	None	None	None	None	HP DJ610 Printer	None
Bundled software	Lotus SmartSuite Millennium	Lotus SmartSuite Millennium	Lotus SmartSuite Millennium	MS W orks Suite 99	Lotus SmartSuite Millennium	MS W orks Suite 99	MS Office 2000 SBE
Standard warranty	Inst +1 yr on-site	1 yr on-site	2 yrs on-site	1 yr on-site	1 yr on-site	1 yr on-site + 2 yrs C&R	Inst +1 yr on-site



							
Evesham Micros	Gateway	Lexon	Mesh	Panrix	Simply Computers	SMC Direct	Viglen
500 Athlon TNT2	Performance 500	Ultima 702	Matrix 500 Pro	Force	Systemax Pro 500	Infinite DVD Gamer	HomePro P3-500FWr
£1,173.83 (€999)	£1,173.83 (€999)	£1,173.82 (€999)	£1,173.93 (€999)	£1,173.83 (€999)	£1,173.83 (€999)	£1,173.83 (€999)	£1,173.83 (€999)
0800 038 0800	0800 55 2000	01442 241 700	020 8208 4706	0113 244 4958	08707 297 366	01753 550 333	020 8758 7000
01386 769 795	+353 1848 2022	01442 218 300	020 8208 4493	0113 244 4962	08707 274 020	01753 524 443	020 8758 7080
www.evesham.com	www.gw2k.co.uk	www.lexonpc.com	www.meshplc.co.uk	www.panrix.com	www.simply.co.uk	www.smcdirect.com	www.viglen.co.uk
Athlon 500MHz	Pentium III 500MHz	Pentium III 600MHz	Athlon 500MHz	Athlon 600MHz	Pentium III 500MHz	Pentium III 450MHz	Pentium III 500MHz
128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM	128MB/SDRAM
1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
640MB	640MB	640MB	640MB	640MB	640MB	640MB	640MB
768MB	768MB	768MB	768MB	768MB	768MB	768MB	768MB
Maxtor DiamondMax	IBM Deskstar	IBM Deskstar	Quantum	IBM Deskstar	Fujitsu AT	Maxtor DiamondMax	Western Digital
20GB/EIDE	6GB/EIDE	25.2GB/EIDE	13GB/EIDE	18GB/EIDE	13GB/EIDE	10.2GB/EIDE	13.6GB/EIDE
Panasonic Zip	n/a	Mitsumi CD-RW	lomega Zip	n/a	n/a	n/a	Panasonic LS-120
100MB	n/a	640MB	100MB	n/a	n/a	n/a	120MB
IDE	n/a	IDE	IDE	n/a	n/a	n/a	IDE
MSI	Intel	Abit	Microstar	Asus	AOpen	Abit	MSI
AMD	BX	BX	AMD	Via	BX	BX	BX
512K	512K	512K	512K	512K	512K	512K	512K
3/3	5/3	3/4	4/3	3/2	3/3	4/2	4/2
1/1	3/2	1/2	2/1	1/2	1/2	2/1	2/1
4/1/1	4/0/1	4/1/1	4/1/1	4/0/1	4/1/1	4/1/1	3/2/1
2/1/1	3/0/0	2/1/1	2/1/1	3/0/1	2/1/1	2/1/1	1/2/1
2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
Creative	Panasonic	Panasonic	Pioneer	Samsung	Pioneer	Pioneer	Pioneer
5x/EIDE	6x/EIDE	6x/EIDE	10x/EIDE	6x/EIDE	10x/EIDE	10x/EIDE	10x/EIDE
Creative Labs	Creative Labs	Creative Labs	Creative Labs	Via	Aureal	Creative Labs	Creative Labs
SB 128 PCI	SB 128 PCI	SB 128 PCI	SB Live! 1024	On-board	Vortex 2	SB Live! 1024	SB Live! 1024
Creative CSW 52	Creative GCS200	Labtec LCS-1030	Creative 4 Point Surround	Labtec LCS-1030	Teac Powermax 500	Philips MMS110	Altec Lansing + sub ACS33
Chaintech Desperado	Voodoo3 3000	Diamond Viper V770	Creative Riva TNT2	Matrox G400	Matrox G400	Matrox G400	ATI 128 Pro Fury
Riva TNT2 M64	Voodoo3	Riva TNT2	Riva TNT2 M64	G400	G400	G400	ATI Rage 128 Pro
32MB/32MB/SDRAM	16MB/16MB/SDRAM	32MB/32MB/SDRAM	32MB/32MB/SDRAM	32MB/32MB/SDRAM	16MB/16MB/SDRAM	16MB/16MB/SDRAM	32MB/32MB/SDRAM
AGP	AGP	AGP	AGP	AGP	AGP	AGP	AGP
Vibrant VM71RDA-E01	Gateway EV700	LG 795FT+ Flatron	Mitsubishi Diamond Pro 710	Hitachi CM650 GT	Taxan Ergovision EV735 TC099	Iiyama VisionMaster Pro 410	Viglen OEM/Envy 17AP
17in/16in	17in/15.9in	17in/16in	17in/16in	17in/16in	17in/16in	17in/16in	17in/16in
1,280x1,024/60Hz	1,600x1,200/60Hz	1,600x1,200/75Hz	1,600x1,200/60Hz	1,600x1,200/60Hz	1,280x1,024/65Hz	1,600x1,200/75Hz	1,280x1,024/160Hz
Diamond Supra 56K	56K W inbledon	Diamond Supra 56K	Diamond Supra 56K	Diamond Supra 56K	Adtel 56k	Diamond Supra 56K	US Robotics 56K
V.90	V.90	V.90	V.90	V.90	V.90	V.90	V.90
None	None	None	None	None	Canon BJC1000 printer Canon FB320 Scanner	None	MS Sidewinder Joystick
Lotus SmartSuite Entertainment	MS Works Suite 99	MS Office 2000 Pro	Corel Word Perfect MS Office 2000	Lotus SmartSuite Millennium	MS Works Suite 2000	Lotus SmartSuite Millennium	MS Works Suite 99 Games Bundle 99
2 yrs on-site	1 yr on-site + 2 yrs RTB	1 yr on-site	1 yr on-site + 2 yrs RTB	1 yr on-site + 2 yrs RTB	1 yr on-site	1 yr on-site	1 yr on-site

Editor's Choice

Buying a PC is still a daunting prospect for many, and this month we've focused our attentions on those who want the easiest initiation into the world of PC productivity. In the past few years, the industry has tried to get its act together and churn out units that appeal to first-time buyers rather than technical geniuses. Things are better than they were, but there is still a long way to go before turning on your PC is no more challenging than using the toaster.

Colour-coding was a problem for all but three of the manufacturers here. Only the massive buying power of Dell, Compaq and Gateway enabled them to provide us with a keyboard, mouse, monitor and speakers that had coloured connectors which matched the appropriate port. Quite a few of the companies opted for wall charts to outline in simple steps

fast Pentium III 600MHz processor, TNT2 graphics card, LG Flatron monitor and CD-RW. We weren't impressed with the out-of-the-box presentation, though and this, combined with a missing monitor cable and the fact that a CD-RW could be confusing for a first-time user, robbed the company of an award. For the more technically minded among you, however, it's worth a look.

Our Editor's Choice

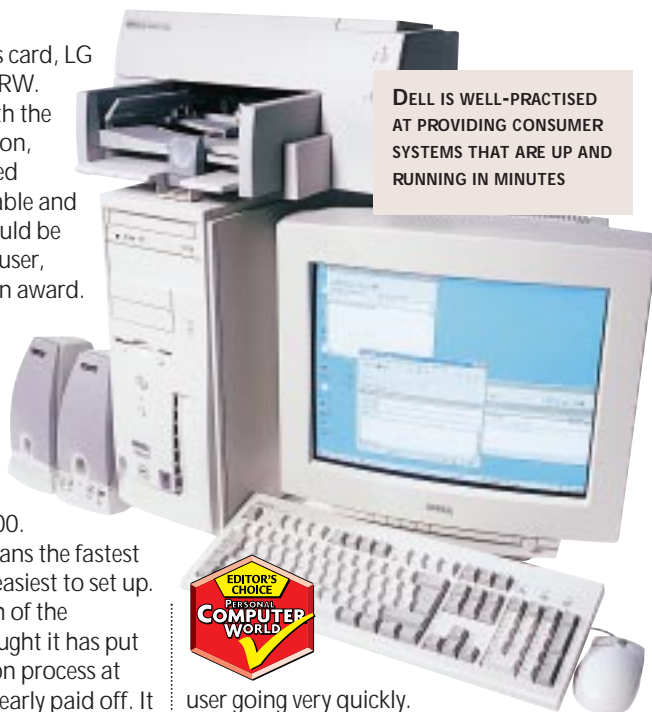
this month goes to Dell's Dimension XPS T500. Although it was by no means the fastest machine here, it was the easiest to set up. The US giant makes much of the investment, time and thought it has put into refining its production process at every level, and this has clearly paid off. It had all the relevant software, cables

and peripherals in a box at the top, together with an excellent wall chart. Each peripheral was colour-coded and you even get a basic HP printer in the bargain.

Our first Highly Commended

award goes to Gateway for its Performance 500. Again, this was not the best-performing machine, or even the best value, but it was one of the easiest to set up. One of

Gateway's most important markets is the home sector and this is clearly reflected in the quality of its packaging. Again, all the peripherals were colour-coded, everything was placed in easy-to-access boxes at the top of the main box and the wall chart will get the most inexperienced



DELL IS WELL-PRACTISED AT PROVIDING CONSUMER SYSTEMS THAT ARE UP AND RUNNING IN MINUTES



user going very quickly.

Our second Highly Commended

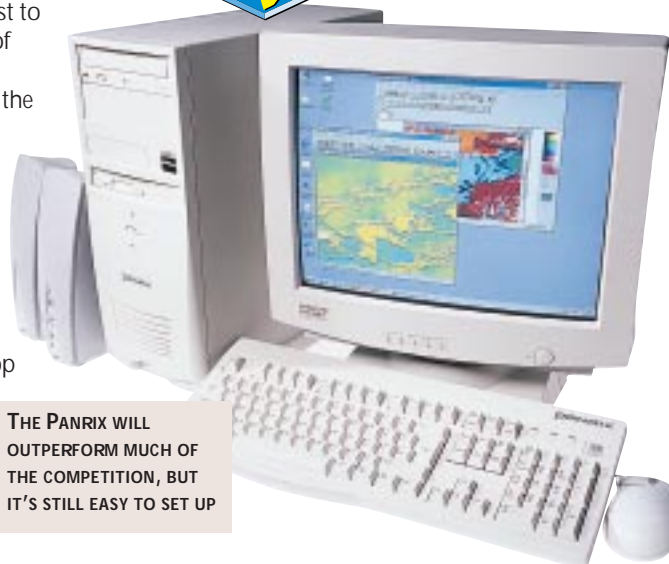
award goes to Panrix. The Force was definitely with this PC: it was one of the fastest machines here and was consistently speedy in both our 2D and 3D tests. This was down to the 600MHz Athlon processor and the 32MB Matrox Millennium G400 graphics card. Although it was not quite as easy to set up as the Dell and Gateway systems, it was still pretty good. If you're prepared to sacrifice colour-coding, then this system represents better value for money and faster performance – definitely worth a look.



GATEWAY GETS AN AWARD FOR PUTTING EASE OF USE OVER PERFORMANCE

how to put your system together, although these varied in quality. Almost all of the manufacturers, however, managed to set up the computer correctly, with the correct software loaded and all the drivers present.

Before turning to the awards themselves, we should mention Atlas and Lexon, which both provided us with very impressive machines that didn't quite make it. Atlas impressed us with a good CTX Trinitron monitor, Athlon 600MHz processor and installation engineer, but lost out due to a lack of attention to detail. That said, it's still worth considering. Lexon provided a very highly specified machine for the price, with a



THE PANRIX WILL OUTPERFORM MUCH OF THE COMPETITION, BUT IT'S STILL EASY TO SET UP

Crowning your prints

Every business has different printing needs, but whether you're looking for **speed or quality**, low-end or high-end, we've got what you need. So sit back, relax, and follow our in-depth guide...

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• *Printers reviewed by Jason Jenkins and Will Head.*

Tested by Jon Sayers.

Ratings

- ★★★★★ Buy while stocks last
- ★★★★ Great buy
- ★★★ Good buy
- ★★ Shop around
- ★ Not recommended

If you are looking to buy a printer for your small business then you're in luck, as there are plenty of options.

This month we take a look at a cross-section of the models currently on offer and put them through our series of rigorous bench tests. We have split them into two distinct groups: low end (under £300 ex VAT) and high end (over £300 ex VAT). So to see what you can get for your money and what difference there is between the two price points, read on.

How we did the tests

Each printer was tested on the same PC, using the drivers supplied by the manufacturer. At the end of each test, the drivers were removed to ensure a clean install for the following machine. We took a note of the time it took for each printer to produce a 50-page Word document, a 50-page PDF, a 12-slide PowerPoint presentation and an A4 letter. We then let the printer go into standby mode and timed how long it took to wake up when the same A4 letter was sent through. The final test involved printing a greyscale image and a page of graduated text. We decided which of the printers had the best and worst quality output and came up with a rank order. For the greyscale image, we were looking at which machine could produce the clearest, sharpest picture with the correct level of uniform shading. For the page of graduated text, we used a magnifying glass to check the text and establish the quality of its smallest characters. We were looking for problems such as toner spread and the legibility of the text at a variety of point sizes.

Brother HL-1250

Low end

This compact machine has everything you could reasonably ask for at the price and is a deserved winner of our Editor's Choice award. We found it very easy to set up, and Brother had been thoughtful enough to include drivers in both floppy and CD format. An A3 wallchart was included, with some easy-to-follow instructions to get you going. There was even a useful instruction video clip on the driver CD to help you out if you get stuck.

Brother impressed us with the inclusion of both parallel and USB ports. The printer supports PCL Level 6 but not PostScript. In our tests, the 4MB of RAM – combined with the 66MHz processor –



made this a fairly nippy model for the price and it was unbeatable in the PDF test.

This was not reflected in the Word document speed, however, where it ranked very poorly.

One other gripe we had concerned the manual-feed slot. There's no support for any paper you put in it, which could be irritating if you intend to use the feeder a lot. It does have a 250-page paper tray at the bottom of the unit, however, and there is a visual indicator so you can see

how much paper remains without having to open it up to take a peek. Overall, this is an excellent printer, with a low running cost – a great buy for low-end users.

PCW DETAILS



★★★★★

Price £245.58 (£209 ex VAT)

Supplier Simply 08707 297 366
www.brother.com

Good points Low running cost, USB and parallel ports, good performance results

Bad points Lack of support for paper in the manual-feed slot

Conclusion A fantastic all-rounder and it's even small enough to fit on your desk

Canon LBP-800

Low end

This is one of the cheapest printers here, but it's also one of the best. It did well in most of our performance tests and was especially fast considering its low price. We found it easy to set up and liked the printer driver's status monitor, which shows how many pages there are left to print and how long they will take. We had one grumble: the printed manual was very basic – a more in-depth version appears in PDF format on the CD.

The LBP-800 only has a parallel interface, but at this price we don't feel that we can complain. Paper sits in the



top of the printer in a 125-sheet tray, which is supplemented by a manual-feed slot. There are no LEDs to indicate status, and you can't change any of the printer settings from a front panel – it only has a power button.

This is a very impressive printer, which performed better than our Editor's Choice. However, the running cost is relatively high – a 2,500-sheet toner cartridge costs £60 ex

VAT. Compare this to Brother's 3,000-page cartridge for only £32.99 ex VAT and you can see why the HL-1250 has the edge. But if you want a printer that costs less to initially set up, this is it.

PCW DETAILS



★★★★★

Price £218.55 (£186 ex VAT)

Contact Dabs Direct 0800 138 5204
www.canon.co.uk

Good points Good performance results, low initial outlay

Bad points High running cost

Conclusion A great performer that costs little to buy initially. Beware of the running cost though

Epson EPL-5700

Low end

This was one of the fastest low-end printers in the test and on this basis was doing very well. It raced along on both the word and PDF tests and had a fast recovery from standby. However, when it came to judging print quality, the EPL-5700 was not the best on offer.

Its speed was due to the 4MB of memory supplied in our version together



with the fast 100MHz processor. We found the printer extremely easy to set up – just a few clicks and it was ready to go. It came with both parallel and serial ports. Build quality is good – it looks and feels robust and the single paper tray inserts into the base of the unit. A button on the side of the printer opens it up for access to the inner workings. There's no LCD, of course, but there are three status indicator LEDs on the front and four control buttons, so it's fairly easy to change some settings without using the driver software. It supports PCL Level 5e and has an option for PostScript Level 2, if you feel you need it. Running costs are roughly on a par with our

Editor's Choice – a 6,000-sheet toner cartridge costs £60.91 ex VAT. If speed is the most important thing to you when you're choosing which laser to buy, then this is definitely worth a look, as it's the fastest printer available at this price.

PCW DETAILS

★★★★★

Price £277.30 (£236 ex VAT)

Contact SMC 01753 550 333
www.epson.co.uk

Good points Very fast for the money

Bad points Quality could be better

Conclusion A good, fast, easy-to-use printer that let itself down in the quality tests

HP LaserJet 1100A

Low end

Printing has been part of HP's core business for many years now, but the company is at its best when producing high-end workgroup printers rather than the lower-end model seen here.

Although this is a good product, it is more expensive than others on test and under-performs when compared to the competition. Its main problem is that it only comes with 2MB of memory. This contributed to its very slow result on the PDF and PowerPoint presentation tests, although it was the fastest low-end printer in the Word document test.

It was easy to set up, with very user-



friendly driver software. There's a well-written manual in both printed and on-line format. Paper is contained

in an upright stand – for this price we would have preferred a dedicated fold-away tray. It can only hold 125 pages compared to other more generous 250-page models and it has a parallel port but no USB or serial – again, for the price we would like to have seen one of these. Running costs are slightly higher than other printers on test, although they are by no means exorbitant – a 7,000-page

toner cartridge will set you back £47 ex VAT. In common with most of the other printers in this group test it does not support PostScript, but PCL Level 5e is there in all its glory.

PCW DETAILS

★★★★

Price £334.88 (£285 ex VAT)

Contact SMC 01753 550 333

www.hp.com/uk

Good points Easy to use, fast performance on text

Bad points PDF and PowerPoint performance was slow

Conclusion Not a bad printer, but it's eclipsed by its cheaper rivals

Kyocera FS-680

Low end

This is one of the cheapest printers in this category as far as running costs are concerned. It supports both PCL Level 5e and PostScript Level 2 – a rarity at this price. Performance-wise, it wasn't the fastest printer, but it would still be adequate for a small office on a budget. It was best when printing text and coped with the PDF document fairly well. However, when it came to printing a PowerPoint presentation, we had problems getting it to print the first page of our test document. This was resolved by downloading a new driver from Kyocera's website. Once it was functioning correctly, its performance on this test was bad – it was the slowest of all the printers regardless of category.

The FS-680 was not the easiest

printer to install, and the installation program took some finding on the supplied CD-ROM. In terms of quality it was not among the best either, but for day-to-day



operation this is not a serious issue. Build quality was good, with a paper tray at the base and six LEDs to show its status. It comes with 4MB of memory, which can be upgraded to 36MB.

PCW DETAILS

★★★★★

Price £280.83 (£239 ex VAT)

Supplier Simply 01753 550 333

www.kyocera.co.uk

Good points Good build quality, fast on some tests

Bad points Flagged on PowerPoint, harder to install than others

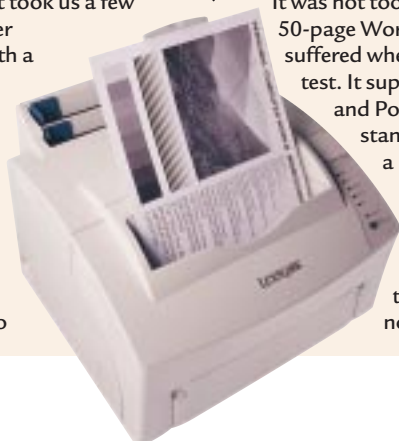
Conclusion A fair model that doesn't quite manage to win any awards

Lexmark Optra E310

Low end

Lexmark has made its name by consistently supplying good-quality workgroup printers. As such, it looks a bit out of place in this lower-end group, with this model failing to impress in our tests. It was fairly easy to install, although it took us a few clicks to get the driver correctly loaded. Both a printed and an online manual came bundled with this printer, which gave good, detailed information on setting up and using the machine.

Although the E310 looks similar to



some of the other models reviewed, it has a faster 67MHz processor. However, it only comes with 2MB of memory as standard, which may help to explain why it didn't produce the speedier results we were expecting from this faster processor.

It was not too bad when printing the 50-page Word document but suffered when attempting the PDF test. It supports both PCL Level 6 and PostScript Level 2 as standard, which we felt was a big plus at this price.

Quality-wise it was not the best, but if most of your printing is confined to generating text documents this will not be a huge issue.

Paper passes into the printer through a slot in the top, which can handle up to 150 sheets at one time, and out to a tray at the front capable of holding 100 sheets.

PCW DETAILS

★★★★

Price £304.33 (£259 ex VAT)

Contact SMC 01753 550 333

www.lexmark.co.uk

Good points Fast processor, both parallel and USB included

Bad points Let down by a lack of memory that crippled the speed

Conclusion A fairly good printer that could have been so much better with a bit more memory

Oki Okipage 6w

Low end

This is the cheapest printer on test and, unfortunately, this was reflected in the test results. It comes with a mere 512K of memory, which can't be upgraded. It is not network compatible and does not support either PCL or PostScript. As such, it is not a model that we would recommend for the small-business user, but may still be of interest to someone looking for a cheap personal laser. A toner cartridge only costs £12.99 ex VAT but, at the same time, you only get 1,500 pages out of it.

Unsurprisingly, it didn't fare well in our performance bench mark tests.



Although it was not bad on our PDF test, it didn't cope particularly well with our 50-page Word document. Quality of output was not the best, but for this price it was not something we expected to be perfect.

The machine looks very basic. Paper feeds from the 100-page paper tray on the top and out through a slot in the bottom. There is only a single power LED on the front and it is not possible to adjust the settings using the panel – we had to use the driver software provided.

Overall, this printer is not a total write-off – it is very cheap after all. We wouldn't recommend it for your business, however, and you'd be better saving up for something more expensive.

PCW DETAILS



Price £139.83 (£119 ex VAT)

Contact Dabs Direct 0800 138 5204

www.oki.co.uk

Good points Low cost

Bad points Poor performance, lack of features

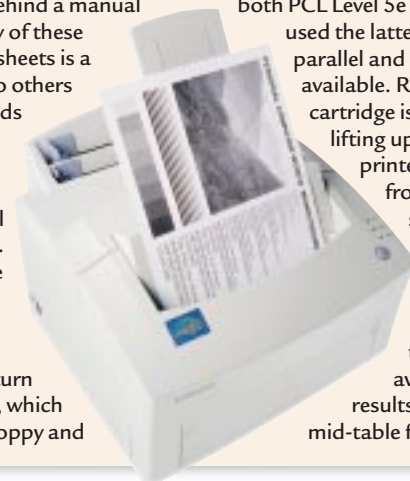
Conclusion This machine is not appropriate for a small business

Samsung ML-5100A

Low end

This offering from Samsung features a top-loading paper tray, situated just behind a manual feed slot. The capacity of these could be larger – 150 sheets is a bit stingy compared to others on test here. A rest folds out at the front of the printer to enable the exiting paper to sit in the tray tidily. This will hold up to 100 sheets.

Three lights on the front of the printer indicate its status. To change the printer's setting you'll have to turn to the driver software, which is provided on both floppy and



CD-ROM. This model was very easy to install, with the setup program installing both PCL Level 5e and 6 drivers (we used the latter when testing). Both parallel and USB ports are available. Replacing the toner cartridge is a simple matter of lifting up the top panel of the printer, while a flap at the

front allows for a straight paper path. The 4MB of memory and 33MHz RISC processor combined to produce fairly average performance results. This model came mid-table for all of the speed

tests, although its image quality was good. Running costs are higher than others featured here, with a 5,000-sheet toner cartridge costing £65 ex VAT.

Overall, this is not a bad printer by any means, but is fairly forgettable when you look at the competition.

PCW DETAILS



Price £233.83 (£199 ex VAT)

Contact Dabs Direct 0800 138 5204

www.sam_sungelectronics.co.uk

Good points Includes both USB and parallel ports

Bad points Higher running costs

Conclusion An average model

Tally T9308

Low end

If you think this printer looks familiar, then you're not alone – this model looks the same and has the same basic specifications as Samsung's and Xerox's low-end offerings. This 4MB printer has a 33MHz processor, which helped it to come just below the others here in the speed tests. All of the speed results were roughly the same, although it was slightly faster on the PDF test. Its best feature, however, was its quality output. Running costs are higher than some of its rivals – £68 ex VAT for a 5,000-page toner cartridge is not the best value.

In terms of printer protocols, the T9308 supports PCL Level 6. We found this model fairly easy to set up,

with the toner easy to load. In contrast to the higher-end Tally printer, drivers came on CD and not floppy disk. It also came with a good printed manual.

Paper is stored in a slot at the top, with a manual feed input in front of it. Three lights indicate the printer's status. Build quality was not as good as others and it felt slightly cheap. The door covering the toner is restricted from opening too



far by a thin piece of plastic, which could get damaged with prolonged use. This was a fairly average offering – not terrible but there are much better buys here.

PCW DETAILS



Price £287.88 (£245 ex VAT)

Contact Dabs Direct

0800 138 5204

www.tally.co.uk

Good points In common with the Samsung ML-5100A, it has both USB and parallel ports

Bad points Higher running costs

Conclusion There are better buys at the price

Xerox DocuPrint P8EX

Low end

We complete our round-up of the lower-end printers with a by now familiar model. Like the Samsung and Tally, this unit has 4MB of memory and a 33MHz processor. Results were similar to its cousins, with the £239 ex VAT printer managing to complete our performance tests adequately enough but without dazzling us. Again, there are better options available at the price.

We found this model easy to set up. Drivers came on a single floppy disk rather than a CD-ROM. Xerox scored brownie points for including a printer cable with its machine – one of the few



manufacturers to be kind enough to do this. The printer's input tray is vertical and can hold up to 150 pages. Paper is drawn into the printer through this tray and output to a vertical tray at the front of the printer. This can hold 100 pages.

One thing we did not like about the printer was the LEDs – these had pictures rather than text next to them, which was slightly confusing. Toner is very expensive – £75.75 ex VAT for only 5,000 pages. This is above most of the other printers in the low-end section. It supports PCL Level 6 and 5e but not PostScript.

Overall, this is not a machine we would recommend – there are better, cheaper implementations of this particular printing engine available elsewhere in the test.

PCW DETAILS

★★

Price £280.83 (£239 ex VAT)

Contact Simply 01753 550 333
www.xerox-em.ea.com/xcg

Good points In common with the Samsung ML-5100A, it has both USB and parallel ports

Bad points Higher running costs

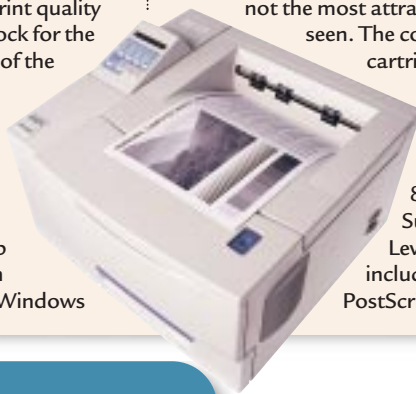
Conclusion There are better buys at the price

Epson EPL-N1600

High end

The Epson EPL-N1600, the first of our higher-end printers, boasts a print speed of 16ppm and came second in the PDF test, taking only 207.62 seconds. The Word document was a harder test, with the Epson sliding down to sixth place – and scoring fifth overall for standby performance. Print quality was the major stumbling block for the N1600, placing it tenth out of the high-end printers.

The machine was equipped with 8MB of memory, upgradable to a maximum of 40MB, with a 150MHz RISC VR4300 processor at its heart. Setup proved simple enough, with drivers supplied on CD for Windows



95/98, NT 3.x and OS/2. Unfortunately, there was no quick-setup sheet in the box. The machine offers both parallel and serial connections and can be upgraded to a network printer for £219 ex VAT. The small LCD was functional, but hard to read and the controls underneath were not the most attractive we have

seen. The combined toner cartridge and drum comes in at £87.67 ex VAT and should provide 8,500 pages. Support for PCL Level 5e is included but PostScript comes as an

optional extra. The input and output paper trays have a capacity of 250 sheets.

On the whole, the Epson offered good performance in the speed tests, but was sadly lacking in print quality.

PCW DETAILS

★★★

Price £699.13 (£595 ex VAT)

Supplier Simply 08707 297 366
www.epson.co.uk

Good points Good PDF performance

Bad points Scored poorly in the print quality test

Conclusion While not a bad printer, there are better alternatives

HP LaserJet 2100

High end

The HP LaserJet 2100 is not as expensive as its big brother, the 4050T, costing just £423 ex VAT. However, the difference in price is reflected in the results. Although the 2100 scored highly on quality and printing from standby, it was poorly let down by its speed on the 50-page Word and PDF documents,

coming last in both sections. Based around the Intel 80960JD processor with 4MB of RAM as



standard, the 2100 can be upgraded to a maximum of 52MB. As standard you'll find connectors for parallel and infrared, with network upgrades starting at £120 ex VAT. The quoted print speed was 10ppm with a maximum resolution of 1,200dpi. A toner cartridge will set you back £80.80 ex VAT and lasts for 5,000 pages. PCL Level 6 and PostScript Level 2 are supported, with drivers for Windows 95/98, NT and 3.1. In the box was a double-sided A2 poster to assist setup.

The parallel port has been neatly hidden away beneath a plastic cover, but this does make it a little hard to find. The printer came equipped with a 250-page input tray and a 150-page output tray, with the option to add a further input tray if necessary. The input tray also

displays how much paper is left. Unfortunately, the 2100 does not have an LCD display, which could make management an issue.

PCW DETAILS

★★★★

Price £497.03 (£423 ex VAT)

Contact SMC 01753 550 333
www.hp.com/uk

Good points Parallel port hidden away, easy to set up

Bad points No LCD, poor Word and PDF performance

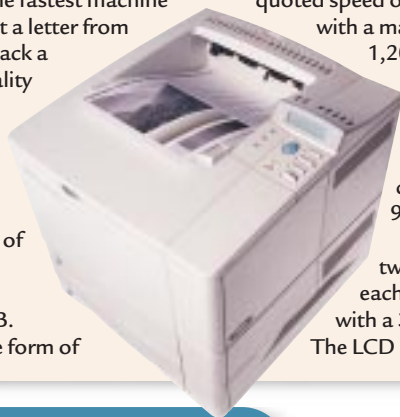
Conclusion The 2100 was an admirable contender, but it never really excelled

HP LaserJet 4050T

High end

The most expensive machine on test was HP's LaserJet 4050T – for £807 ex VAT you'd expect a good-quality printer and thankfully we were not let down. The HP scored highly in the speed tests, being the fastest machine to wake up and print a letter from standby. It did fall back a little in the print quality tests, coming in seventh place.

The machine itself features a 133MHz RISC chip, coupled with 16MB of RAM as standard, upgradable to a maximum of 200MB. Connectors take the form of



parallel, serial and fast infrared. For an extra £211 ex VAT you can upgrade the 4050T to a network printer. Toner prices start at £80.10 ex VAT and each cartridge should be good for 10,000 pages. The

quoted speed of the printer is 17ppm, with a maximum resolution of 1,200dpi. The HP supports PCL Level 5e and 6 as well as PostScript Level 4. In the box you'll find 30 TrueType fonts and drivers for Windows 95/98, NT and 3.1.

The printer features two input paper trays – each holding 250 sheets, with a 300-page output tray. The LCD is backlit, making it easy

to read with a simple-to-operate menu system. The input trays also have a paper-level indicator, making it easy to see how much paper is left.

PCW DETAILS



★★★★★

Price £948.23 (£807 ex VAT)

Supplier SMC 01753 550 333

www.hp.com/uk

Good points Good speed performance, PCL Level 6 and PostScript Level 4

Bad points Most expensive printer on test

Conclusion The 4050T provided the best mix of performance and features

Kyocera FS-1750

High end

Kyocera's FS-1750 finished in the middle of the pack overall. For £579 ex VAT, you get a 1,200dpi printer with a claimed speed of 14ppm. Print quality was good, but its speeds printing the Word document

and from standby were not as impressive.

A better score on PDF printing was not enough to bump up the Kyocera's overall score.

The printer comes with 8MB of RAM as standard, upgradable to a

maximum of 72MB. The processor is a PowerPC chip clocked to 100MHz. Communications can be made either by the parallel or serial port as standard, with Ethernet options starting at £259 ex VAT. A toner cartridge will set you back £60 ex VAT and should last for 20,000 pages. In the box there are drivers for Windows 95/98 and NT, with drivers for Windows 3.1 and OS/2 available from Kyocera's website. Support for PCL Level 6 and PostScript Level 2 is also included.

The input tray can hold up to 250 sheets of paper and the output tray has an equal capacity. The LCD was easy to read and simple to navigate, which should ensure easy management. No basic setup sheet was provided, but the manual was detailed and easy enough to

follow. We had a couple of problems with paper jams, but these were easy to clear, as releasing a tab allows the internal mechanism to come right out. We also encountered a few paper-feed problems, with two pieces being fed in at a time.

PCW DETAILS

★★★★

Price £680.33 (£579 ex VAT)

Contact SMC 01753 550 333

www.kyocera.co.uk

Good points Reasonable performance

Bad points We encountered a couple of paper-feed problems

Conclusion A good all-round machine, but we did have some problems



Lexmark Optra M410

High end

The Lexmark Optra M410 boasts a 12ppm print speed, at a standard resolution of 1,200dpi. Our test showed that the M410 was fast when printing from standby, but did not fare as well in the other speed tests. The results of the print quality test saw it sitting in the middle of the group.

As standard the M410 comes with 4MB of RAM, upgradable to a maximum of 132MB. It can talk to the PC through the standard parallel port or USB, with a network upgrade available for £350 ex VAT (however, a network-enabled M410n is available

for £689 ex VAT). Drivers are available for Windows 95/98, NT, 3.1 and OS/2. The machine comes equipped with PCL Level 6 and PostScript Level 3. The 250-sheet input and output paper trays are included as standard. A

5,000-page toner

cartridge costs

£74.04 ex

VAT with a

10,000-page

option

coming in at

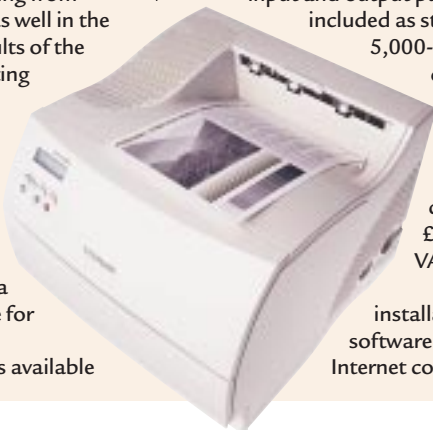
£124.14 ex

VAT.

During

installation, the

software detected our Internet connection and



offered to search for updated drivers.

No setup sheet was included but the manual was very comprehensive, covering everything from basic setup to more detailed operations.

PCW DETAILS

★★★★★

Price £512.30 (£436 ex VAT)

Contact Simply 08707 297 366

www.lexmark.co.uk

Good points Quick to wake up from standby

Bad points Performance in other areas was not up to the same standard

Conclusion A good printer, but just pipped at the post for an award

Minolta PagePro 18L

High end

Minolta's high-end offering performed well in all areas except time taken to print from standby, where it sat in the middle of the field. The quoted print speed was 18ppm at a 1,200 x 600dpi resolution. The 18L uses a combined toner and drum unit that costs £112 ex VAT and should provide 9,000 pages worth of use.

The processor is a Zenographics Zj-RCA chip running at 20MHz, backed up by 2MB RAM, upgradable to a 16MB maximum. The 18L comes with a parallel connector as standard, with an optional



Ethernet connection available for £199 ex VAT. The printer only supports Windows as it is GDI-based, and drivers are only supplied for Windows 95/98 and NT. PostScript Level 2 support is host-based, but there is no support for PCL.

The machine arrived in what seemed like kit form, with quite a lot of parts to assemble. Driver installation was also fairly difficult, as it required a lot of user input. The machine also had no LCD display, instead relying on LEDs with symbols on them that made usability

poor. The unit has input and output trays that can handle 250 pages – but it was quite hard to remove these for filling, which could become annoying over time.

PCW DETAILS



★★★★★

Price £374.83 (£319 ex VAT)

Contact Dabs 0800 138 5204

www.minoltaeurope.com

Good points Excellent performance for the price

Bad points No PCL support, setup was not the easiest

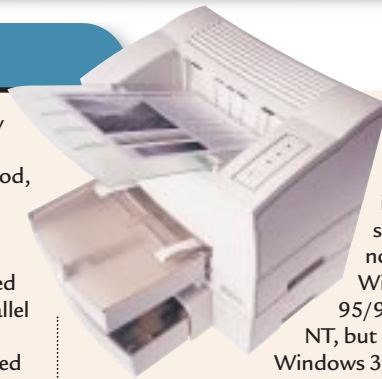
Conclusion If you don't need PCL support and are happy with a GDI printer then the 18L is a good buy

Minolta PagePro 18N

High end

Minolta's PagePro 18N is very similar in design to its smaller sibling, the 18L. Under the hood, however, things are quite different. The 18N uses a 66MHz 403GCX PowerPC processor, combined with 4MB of RAM – which can be upgraded to a 64MB maximum. As well as parallel connectors, the 18N comes with an Ethernet port as standard. The claimed print speed is 18ppm with a maximum resolution of 1,200 x 600dpi.

The 18N uses the combined drum and toner cartridge, as seen on the 18L, notching up 9,000 pages for £112 ex VAT. As well as 250-sheet input and output trays the 18N has an additional 500-page input tray, but again they were fiddly to remove and fill. As the 18N is



not a GDI printer, it supports not only Windows 95/98 and NT, but also Windows 3.1 and OS/2. PCL Level 6 is provided, with PostScript Level 3 offered as an option. The drivers required a lot of user input during installation, making the whole process less efficient than other models.

The 18N won first place for time taken to print the Word document, taking only 176.82 seconds. PDF and

standby performance were less spectacular, however, with the 18N sitting in the middle of the group on both scores. The print quality test saw the 18N taking fifth place.

PCW DETAILS

★★★★★

Price £780.20 (£664 ex VAT)

Supplier Simply 08707 297 366

www.minoltaeurope.com

Good points Ethernet as standard, good Word performance

Bad points Setup was not the best.

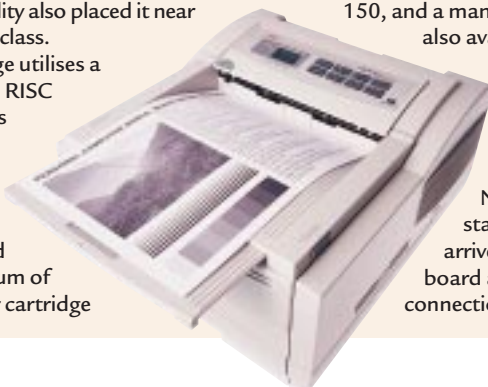
Conclusion Makes up for some of the deficiencies of the 18L but the price tag rises in unison

Oki Okipage 12i/n

High end

The 12i/n is a 1,200 x 600dpi printer with a claimed print speed of 12ppm. Although it was one of the cheapest high-end printers, we found performance a little lacking. It scored highly in the PDF speed tests, but fell down on the Word document and standby time. Print quality also placed it near the back of the class.

The Okipage utilises a 40MHz R3000 RISC chip and comes with 4MB of RAM as standard, although this can be bumped up to a maximum of 36MB. A toner cartridge



comes in at £18.25 ex VAT and lasts for 2,500 pages. However, the drum will need replacing after 20,000 pages, which will set you back £119 ex VAT, with a combined drum and toner unit costing £137.25 ex VAT. The input paper tray can hold 250 pages, with the output catching 150, and a manual feed option is also available. PCL Level 6 and PostScript Level 2 support is included, with drivers supplied for Windows 95/98, NT and 3.1. As standard the 12i/n arrives with Ethernet on-board and parallel connection is also available.

One problem with installation was that the setup program defaulted to 2MB of memory, not the 4MB we had installed in our machine. This resulted in very slow initial print speeds.

PCW DETAILS

★★

Price £480.58 (£409 ex VAT)

Contact SMC 01753 550 333

www.oki.co.uk

Good points Network port as standard

Bad points The price reflects the output and performance

Conclusion The price didn't make up for the poor performance and quality

Samsung ML-7000N

High end

Samsung's ML-7000N managed to scoop top spot in our print quality test, even though it is only a 600 x 600dpi printer. This is down to Samsung's Resolution Technology, which it claims bumps the printer's output up to a level comparable with those in the 1,200dpi class. Unfortunately, it failed to achieve comparable levels of performance in the print speed tests. The results for the PDF document and standby test were disappointing – while the Word document improved matters, but not to a level expected from a £799 printer.

At the heart of the ML-7000N

beats a 100MHz PowerPC chip, coupled to 12MB of RAM, which is upgradable to a maximum capacity of 68MB. Parallel, serial and Ethernet connections are supplied as standard, with an optional infrared interface also available.

The combined toner and drum cartridge should last 8,000 pages for £80 ex VAT a throw. PCL Level 5e and 6 and PostScript Level 2 are supported, with drivers for Windows 95/98, NT and 3.1.



Shortly after switch-on, the printer produced a very strong smell. This may be a minor point, but it could become an issue in an office environment.

PCW DETAILS

★★★★

Price £938.83 (£799 ex VAT)

Contact Dabs 0800 138 5204
www.samsungelectronics.co.uk

Good points Ethernet on board, excellent print quality

Bad points Poor speed

Conclusion If you need the best quality output then the Samsung is a good buy, otherwise you'd be better off looking at other printers in this test

Tally T9116D

High end

Tally's T9116D did not fare well against the competition – taking last place for print quality and scoring second to last in both the PDF and standby test. The Tally did manage to pull forward in the Word print speed, but it was not enough. This 600 x 600dpi printer offers a claimed speed of 16ppm.

The processor at the heart of the machine is a RISC chip clocked to 125MHz,

backed up by 4MB of RAM, which can be increased to a 68MB maximum. A 5,000-page toner cartridge costs £29 ex VAT but after 40,000 pages you'll need to replace the drum at a cost of £163 ex VAT. Support for PCL Level 6 is included as standard, with PostScript Level 2 offered as an option. Drivers for Windows 95/98, NT and 3.1 are included. The machine comes with two parallel connectors and one serial and it will cost £299 to get it talking on a network.

The CD revolution seems to have passed Tally by, as they supplied their drivers on 11 floppy disks. This took an age to install and after all the disk shuffling we still had problems installing the printer under Windows 98. It is also necessary to manually set the paper size

through the drivers, as it can't detect what paper is loaded into it. The input tray can hold 500 pages, with a 250-sheet output tray. There is also a large LCD display, but it was difficult to navigate as the buttons were hard to press.

PCW DETAILS

★★

Price £645.08 (£549 ex VAT)

Contact Dabs 0800 138 5204
www.tally.co.uk

Good points PCL Level 6 support

Bad points Below average performance

Conclusion Tally did not fair well in the tests and as a result was no match for the competition



Xerox DocuPrint N17

High end

Xerox's high-end offering claims a 17ppm print speed at a 1,200 x 600dpi resolution. However, the N17 did not fare that well in our tests. At 62.57 seconds, it took the longest time to print a letter from standby, even longer than every low-end printer as well as the high-end models. Time taken to print the Word and PDF documents placed the printer at the back of the crowd, with similar positioning for the print quality test. For a printer that costs £779 ex VAT, we expect better.

Network capabilities are included as standard with this model. In addition to the Ethernet connection, parallel and

serial are also available.

Toner costs £105 ex VAT for a cartridge that will last 10,000 pages. The machine utilises an Intel i960HD

processor running at 66MHz with 16MB of RAM, which can be upgraded to 104MB. Support for PCL Level 6 and PostScript Level 3 are included, with drivers for Windows 95/98, NT and 3.1.

Installation was simple enough, with the setup utility offering to check for updated drivers on the web. The input tray holds 250 sheets of paper and

there's a 250-page tray to catch its output. The LCD display was a little hard to read at times, as it used symbols rather than text and the control buttons were therefore hard to operate.

PCW DETAILS

★★

Price £915.33 (£779 ex VAT)

Contact Simply 08707 297 366
www.xerox-em.ea.com/xcg

Good points Simple setup

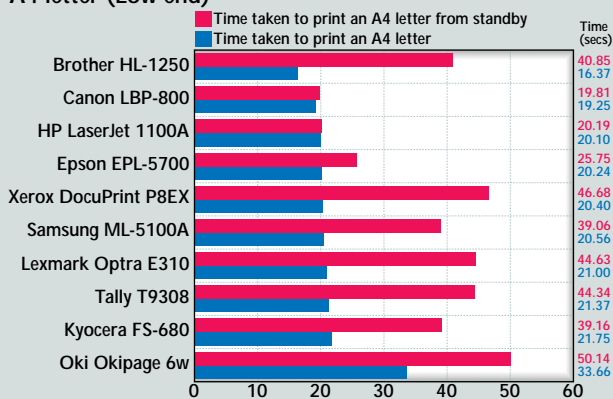
Bad points Poor performance – especially from standby

Conclusion The performance of the N17 in our tests did not justify the machine's price tag

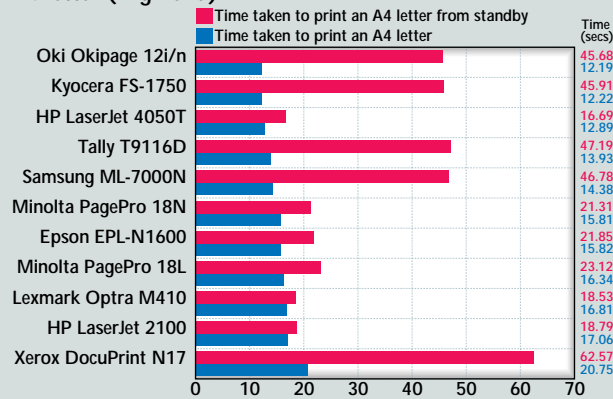




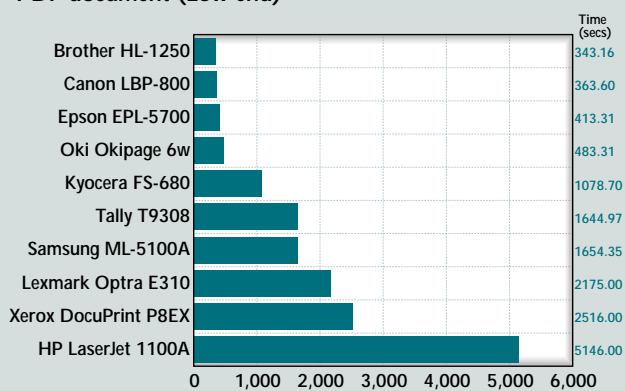
A4 letter (Low end)



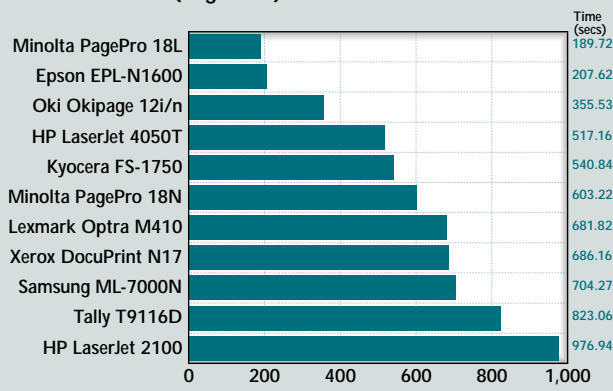
A4 letter (High end)



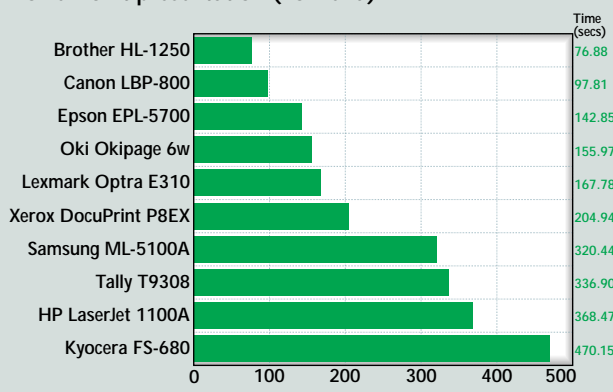
PDF document (Low end)



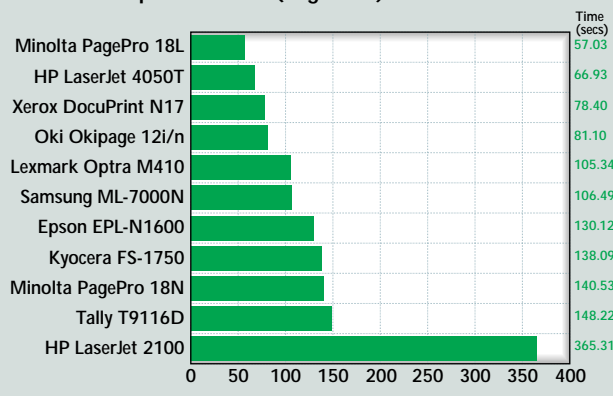
PDF document (High end)



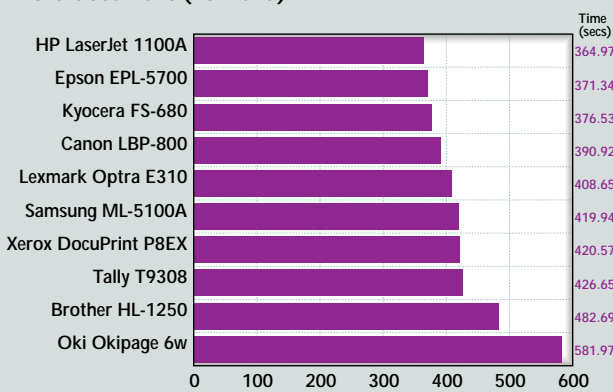
PowerPoint presentation (Low end)



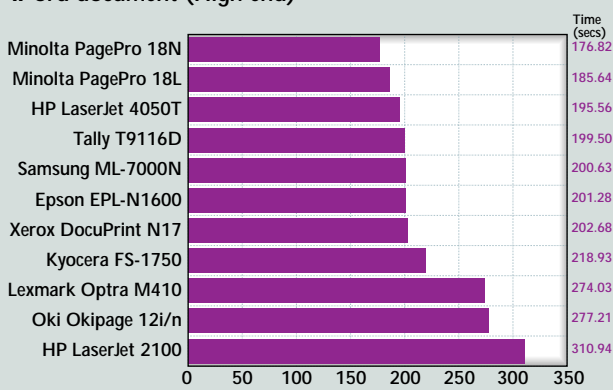
PowerPoint presentation (High end)



Word document (Low end)



Word document (High end)



In all graphs, the shorter the bar, the better the result














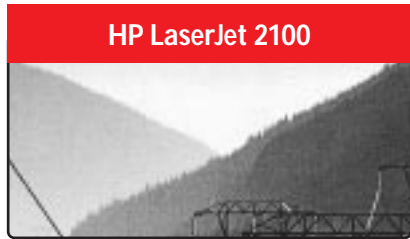
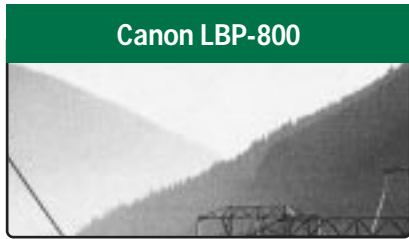
Table of features



MANUFACTURER	BROTHER	CANON	EPSON	HP	KYOCERA	LEXMARK	OKI	SAMSUNG	TALLY	XEROX
MODEL	HL-1250	LBP-800	EPL-5700	1100A	FS-680	E310	6w	ML-5100A	T9308	P8EX
Price ex VAT (inc VAT)	£209 (£245.58)	£186 (£218.55)	£236 (£277.30)	£285 (£334.88)	£239 (£280.83)	£259 (£304.33)	£119 (£139.83)	£199 (£233.83)	£245 (£287.88)	£239 (£280.83)
Manufacturer phone	0845 606 0626	0800 035 3535	01442 261144	0990 474747	0118 923 0789	01628 481500	01753 819819	020 8391 0168	0118 974 2742	0800 454197
URL	www.brother.com	www.canon.co.uk	www.epson.co.uk	www.hp.com	www.kyocera.co.uk	www.lexmark.co.uk	www.oki.co.uk	www.samsung-electronics.co.uk	www.tally.co.uk	www.xerox-emea.com/xcg
Price per page (5% coverage)	0.62p	not supplied	1.2p	not supplied	0.9p	1.42p	1.2p	1.3p	1.247p	1.5p
Supplied memory	4MB	512KB	4MB	2MB	4MB	2MB	512 KB	4MB	4MB	4MB
Maximum memory	32MB	512KB	36MB	18MB	36MB	66MB	512 KB	36MB	36MB	36MB
Ports	Parallel, USB	Parallel	Parallel, serial	Parallel	Parallel	Parallel, USB	Parallel	Parallel, USB	Parallel, USB	Parallel, serial
Cost of network card (ex VAT)	£209	£159	£219	£120	£130	£185	n/a	n/a	n/a	£199
Processor	66MHz RISC	8bit	100MHz RISC VR4300	35MHz Motorola	50MHz PowerPC	67MHz Toshiba	n/a	33MHz RISC	33MHz RISC	33MHz
CONSUMABLES										
Toner cartridge (ex VAT)	£32.99	£60	£60.91	£47	£32.40	£70.81	£12.99	£65	£68	£75.75
Image drum (ex VAT)	£87	n/a	£43.06	n/a	not supplied	n/a	£59	n/a	n/a	n/a
Combined unit (ex VAT)	£119.99	n/a	n/a	n/a	n/a	n/a	£71.99	n/a	n/a	£75.75
OPERATION										
Pages per minute	12	8	8	8	8	8	6	8	8	8
Time to first page (in seconds)	15	17	19	not supplied	20	17	13	15	19	19
Maximum pages per month	15,000	not supplied	12,000	7,000	8,000	10,000	2,500	6,000	6,000	8,000
Toner life (pages)	3,000	2,500	6,000	2,500	3,600	n/a	1,500	5,000	5,000	5,000
Drum life (pages)	20,000	n/a	20,000	n/a	100,000	n/a	10,000	n/a	n/a	not supplied
Engine life (pages)	200,000	not supplied	n/a	not supplied	100,000	100,000	30,000	n/a	100,000	not supplied
LANGUAGES										
PCL Level	6	n/a	5e	5e	5e	6	n/a	5e/6	6	5e/6
PostScript Level	n/a	n/a	2 (optional)	n/a	2	2	n/a	n/a	n/a	n/a
Other	Epson FX-50, IBM Proprinter XL	Canon Advanced Printer Technology	IBM Proprinter, Epson ESC/P	None	IBM Proprinter, DOS, Epson, line	None	Hiper-W -GDI	None	None	None
PAPER										
Paper tray capacity (pages)	250	125	150	125	150	150	100	150	150	150
Output tray capacity (pages)	150	125	100	100	150	100	30	100	100	100
Separate manual feeder?	✓	✓	✓	✗	✓	✓	✓	✓	✓	✗
SOFTWARE SUPPORT										
Windows 95/98	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows NT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 3.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OS/2	✓	✗	✓	✗	✓	✓	✗	✗	✗	✗
Number of additional fonts	72	None	None	None	125	75	None	10	46	110
DRIVER OPTIONS										
Media selection	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓
Real-time status display	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓
Smoothing/resolution enhancement	✓	✓	✓	✗	✓	✗	✓	✓	✓	✗
Multiple pages per sheet	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗



											
	EPSON	HP	HP	KYOCERA	LEXMARK	MINOLTA	MINOLTA	OKI	SAMSUNG	TALLY	XEROX
	EPL N1600	2100	4050T	FS-1750	M410	18L	18N	121/N	ML-7000N	T9116D	N17
	£595 (€699.13)	£423 (€497.03)	£807 (€948.23)	£579 (€680.33)	£436 (€512.30)	£319 (€374.83)	£664 (€780.20)	£409 (€480.58)	£799 (€938.83)	£549 (€645.08)	£779 (€915.33)
	01442 261144	0990 474747	0990 474747	0118 923 0789	01628 481500	01908 200400	01908 200400	01753 819819	020 8391 0168	0118 974 2742	0800 454197
	www.epson.co.uk	www.hp.com/uk	www.hp.com/uk	www.kyocera.co.uk	www.lexmark.co.uk	www.minolta-europe.com	www.minolta-europe.com	www.oki.co.uk	www.samsung-electronics.co.uk	www.tally.co.uk	www.xerox-emea.com/xcg
	1p	not supplied	not supplied	0.3p	1.48p	1.2p	1.2p	1.2p	1p	1.315p	1.05p
	8MB	4MB	16MB	8MB	4MB	2MB	4MB	4MB	12MB	4MB	16MB
	40MB	52MB	200MB	72MB	132MB	16MB	64MB	36MB	68MB	68MB	104MB
	Parallel, serial	Parallel, infrared, LocalTalk	Parallel, serial, infrared	Parallel, serial	Parallel, USB	Parallel	Parallel, Ethernet	Parallel, Ethernet	Parallel, serial, AppleTalk	Parallel x2, serial	Parallel, serial, Ethernet
	£219	£120	£211	£259	£350	£199	n/a	n/a	n/a	£299	n/a
	150MHz RISC VR4300	66MHz Intel 80960JD	133MHz RISC	100MHz PowerPC	74MHz Toshiba	20MHz Zenographics Zj-RCA	66MHz PowerPC 403GCX	40MHz RISC R3000	100MHz RISC	125MHz RISC	66MHz Intel i960HD
	n/a	£80.80	£80.10	£60	£74.04	n/a	n/a	£18.25	£80	£29	£105
	n/a	n/a	n/a	not supplied	n/a	n/a	n/a	£119	n/a	n/a	£157.55
	£87.67	n/a	n/a	n/a	n/a	£112	£112	£137.25	n/a	£163	£262.55
	16	10	17	14	12	18	18	12	16	16	17
	15	not supplied	15	15	17	18	18	9	13	30	not supplied
	65,000	15,000	65,000	30,000	20,000	60,000	60,000	15,000	65,000	35,000	65,000
	8,500	5,000	10,000	20,000	5,000	9,000	9,000	2,500	8,000	5,000	10,000
	n/a	n/a	n/a	300,000	n/a	9,000	9,000	20,000	n/a	40,000	not supplied
	not supplied	not supplied	not supplied	300,000	150,000	300,000	300,000	180,000	n/a	500,000	not supplied
	5e	6	5e/6	6	6	n/a	6	6	5e/6	6	6
	2 (optional)	2	4	2	3	2	3 (optional)	2	2	2 (optional)	3
	IBM Proprinter, Epson ESC/P	None	None	IBM Proprinter, DOS, Epson, line	PPDS	None	None	IBM Proprinter III	None	IBM, Epson	Xerox Font Manager
	250	250	500	250	250	250	250 (+500 optional)	250	500	500	250
	250	150	300	250	250	250	250	150	250	250	250
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓
	✓	✗	✗	✓	✓	✗	✓	✗	✓	✗	✓
	45	210	30	125	48	None	10	None	10	115	110
	✓	✓	✓	✓	✗	✓	✓	✗	✗	✗	✓
	✓	✓	✓	✓	✗	✓	✓	✗	✗	✓	✓
	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓



Editor's Choice

On the whole we were impressed by most of the printers looked at this month. Unfortunately, each group test has to have a winner and in this case picking one was no easy task. While some machines were quicker off the mark as far as print speed was concerned, others had more of an emphasis on quality of output. We took into account each of the

parallel port there was a USB connection and support for PCL Level 6. The times taken to print the PDF document and the letter were impressive, with performance dipping slightly on the Word document and standby tests. After taking everything into account, the HL-1250 is a deserving winner. Snapping closely at its heels is the Canon LBP-800, which takes the **Highly Commended** award for low-end printers. The LBP-800 drew our attention by producing remarkable performance for the price (one of the cheapest on test). It was up near the top in most of the tests, stumbling a little with the Word

document but otherwise scoring well. If you can't quite stretch to a Brother HL-1250, the Canon is definitely worth considering.

Finally, the close-but-no-cigar award goes to Epson, which deserves a mention for its EPL 5700. This printer whizzed through the speed tests, but came a cropper in terms of print quality. So if you're more concerned with having a nippy printer, it may just be worth a look.

thanks to the simple-to-navigate backlit LCD, with everything designed to make the unit easy to operate. The 4050T was the fastest machine to raise its sleepy head and produce a page from standby, taking only 16.69 seconds, while performance in the other areas was not disappointing. The machine faltered a little in the quality



THE BROTHER HL-1250 COMBINED EXCELLENT FEATURES WITH A LOW PRICE OF £209 EX VAT

test results, as well as value for money and ease of setup and use. It's no good having a really fast unit, if it takes three days to

assemble and is a nightmare to manage.

Starting with the low-end

printers, the Brother HL-1250 particularly caught our eye and so it takes the **Editor's Choice** crown. We found it incredibly easy to set up and there was even a video clip on the driver CD in case you got stuck during installation. The combination of features and performance, coupled with the price, were second to none. In addition to the



Moving into the big

boys' territory with the high-end printers, we saw quite a wide spread in the results. In the blue corner, taking the **Editor's**

Choice award, is the heavyweight HP 4050T. Although it was the most expensive printer on test – £807 ex VAT –

HP's LASERJET 4050T WAS THE FASTEST MACHINE TO PRINT FROM STANDBY

the package you get with the HP LaserJet can't be faulted. Support for PostScript Level 4 and PCL Level 6, loads of RAM and plenty of input trays. Management is a breeze



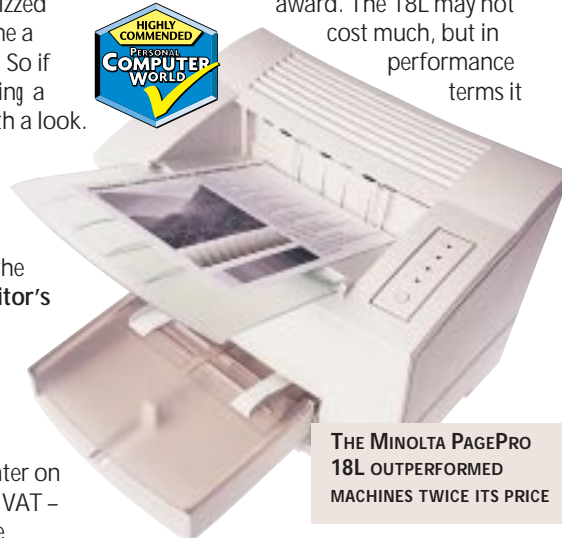
CANON'S LBP-800 WAS ONE OF THE CHEAPEST ON TEST BUT SHONE WITH ITS PERFORMANCE



department, but other than that

we were very impressed.

In the red corner is the bantam weight Minolta PagePro 18L weighing in at a mere £319 and the proud runner up taking this month's **Highly Commended** award. The 18L may not cost much, but in performance terms it



THE MINOLTA PAGEPRO 18L OUTPERFORMED MACHINES TWICE ITS PRICE

beat some of the machines that were twice its price, and was the fastest machine in our PDF test. If you are happy with a GDI printer and don't need things like PCL then the 18L is worth a look. It was not the easiest to set up or configure but for £319 we're not going to argue. The 18L was a good little performer and a worthy adversary for the HP 4050T.

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• Databases reviewed by Tim Anderson.

Databases

Traditional databases are facing a new challenge to survive in a **web-enabled world**. So how are established and new databases coping with life in cyberspace?

The market for Windows database managers is anything but lively, being dominated by the leading office suites. Microsoft Access is the most widely used, followed by Lotus Approach and Corel Paradox. Then comes FileMaker Pro, a Mac migrant with a loyal following. All these have been around for years and many people use whatever database is bundled

with their PC, but it is important to make an informed choice if you are about to embark on a new database project, so we have rounded up the latest versions for in-depth testing. We also take a look at the new kid on the block, StarBase, part of Star Office which is available free from its new owners Sun Microsystems.

Despite the apparent inactivity on the product front, things are changing in the

database world. The importance of the desktop database, where your data is stored and managed on a single machine, is diminishing. Whether this is a simple address book, or a large business database, or the outcome of years of research into the flight paths of the bumblebee, the chances are you will want to access the data in different ways from different kinds of devices.

break into cyberspace



Businesses want their data web-enabled, both for internal use and for customers to browse products and place orders. Hobbyists want to share their data with other enthusiasts. Everyone wants a quick way to look up phone numbers and email addresses. What this means technically is the future of database management lies with server databases that can accommodate many different

kinds of client, from traditional desktop applications to websites and PDAs.

Alongside this new desire for flexibility, the typical PC has become powerful enough to handle heavyweight server databases like those from Oracle and IBM. These run across a variety of platforms and are well placed to grab new markets from those unwilling to commit to Windows for all their future

database requirements, and conscious that Unix-like operating systems still dominate the web. The web has also brought new opportunities for products like mSQL, popular among those setting up small web-based database systems.

The challenge for the likes of Access and Paradox is how well they can survive in a web-enabled world, so we have paid special attention to that issue.

Microsoft Access 2000

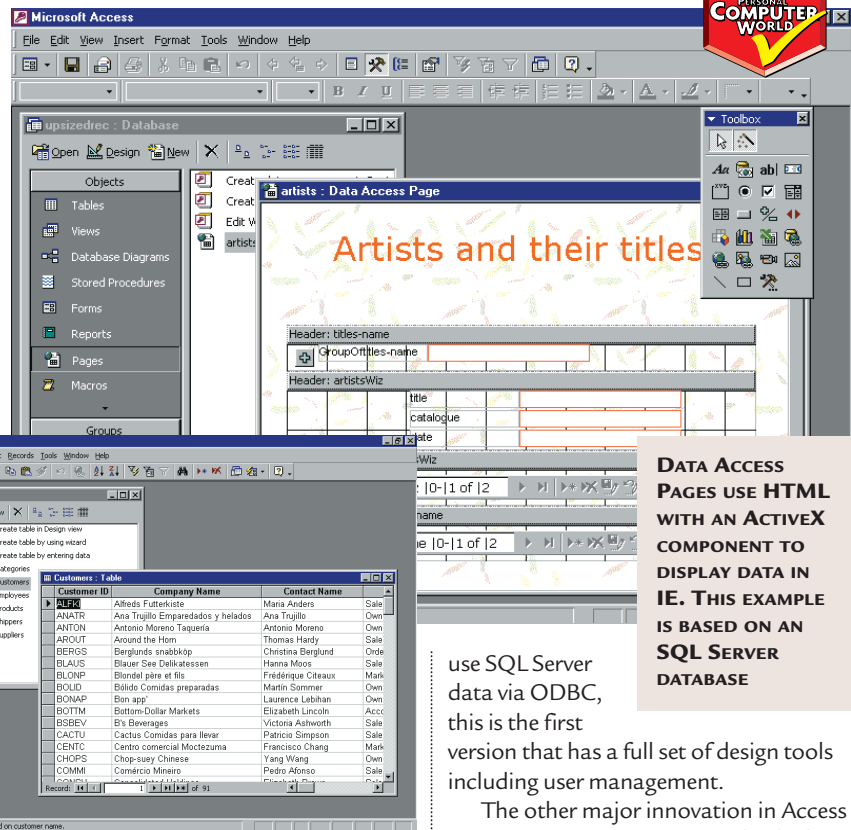
Part of the ubiquitous Microsoft Office, at least in its Professional guise, Access is the one to beat in the Windows desktop database market. It arrived in 1992 and was an instant success. At that time many database applications were still DOS-based, using dBase or Paradox tables. Access was not only a well-behaved Windows application, but was also modelled more on high-end SQL database server than on the DOS heritage.

Access stores each database in a single file with an MDB extension, including not only data but the forms, reports, queries and program code that goes into a typical database application. The main interface shows the contents of a database in a container window with a navigator and detail panes, showing groups of objects including Tables, Queries, Forms, Reports, Pages, Macros and Modules. Some of these require explanation. Data Access Pages are HTML pages which use ActiveX components to display Access data forms in a web browser. Macros are the simple way to automate things, with predefined actions you can arrange in a sequence with simple point-and-click actions. Modules contain Visual Basic (VB) code and are far more powerful, although using them means real programming.

There is a lot to like in Access. The table designer is easy to use and lets you set default values, validation rules and required status as well as the usual data type and field size. Tables open in an Excel-like grid, with instant sorting achieved by right-clicking a column header.

Intuitive searching and filtering is available from toolbar icons. The Query builder has an excellent two-way SQL designer, which lets you switch between editable SQL code and a graphical query designer. Reports are another strong feature, although challenging to novices. However, a wizard can create a simple report for later modification.

The table designer is easy to use and lets you set default values



A CLEAN, UNCLUTTERED INTERFACE IS KEY TO SUCCESS

DATA ACCESS PAGES USE HTML WITH AN ACTIVE X COMPONENT TO DISPLAY DATA IN IE. THIS EXAMPLE IS BASED ON AN SQL SERVER DATABASE

One flaw is that arguably Access has too broad a reach, from novices to professional database developers. This is particularly true in the form designer where the developer features make it over-complicated for beginners. The form designer is not properly integrated with the VB code editor, because Access has its own native forms engine, but uses the standard VBA development environment for editing program code.

Another limitation of Access is that its native database engine and file format is not suitable for networked applications beyond a certain number of users. How many depends on the detail of the system, but it could be as few as

five or as many as 100. If performance is slowing down a client/server system may be more suitable. Access 2000 makes this easy by supporting SQL Server as a second native database engine. A cut-down version, the Microsoft Database Engine, is free to deploy, or Access can work with the full edition of SQL Server 7.0. While Access has always been able to

use SQL Server data via ODBC, this is the first version that has a full set of design tools including user management.

The other major innovation in Access 2000 is Data Access Pages with which you can create browser-based Access forms, although they are designed for intranets rather than for the wider web and require Internet Explorer. An Office licence is required for each user who accesses a Data Access Page. There are more ways than this to publish Access data on an intranet or on the web. Access has ODBC and OLEDB drivers that work with Active Server Pages, VB Web Classes, and other web development systems that work with ODBC. As a file-based database system, an Access MDB is not suitable for busy websites, and you will need a Windows web server. There is no JDBC driver so it is not ideal for Java development.

PCW DETAILS

★★★★

Price £326.43 (£277.81 ex VAT)

Contact Microsoft 0345 002000

www.microsoft.com

Good points Well designed and powerful interface, native support for SQL Server

Bad points Complex advanced features can make it tough going for novices

Conclusion An excellent choice if not pushed beyond its limits

Lotus Approach

Lotus acquired Approach as a desktop database for the SmartSuite office suite in the days before Lotus became part of IBM. One of its original selling points was it did not inflict yet another database format on the world, but works with a number of different database types including ODBC. The default format is the trusty .DBF, in its dBase IV variant.

Approach does not pretend to be the most powerful of databases, but instead aims for ease of use. The starting point when working with Approach is defining

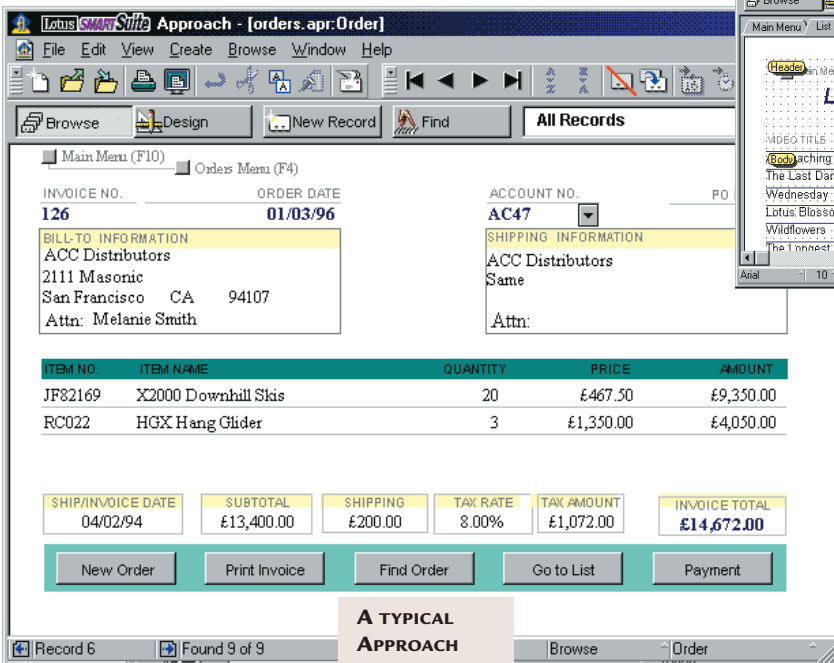
button activates the form so you can begin working with data. A single form is not usually sufficient, so you can add new pages that become tabs in the main view. Reports and queries are simply additional tabbed pages. Any form can serve as a query – clicking the Find button lets you enter example values into fields and search the database on those values.

Custom applications can be built in Approach. Like Microsoft it has a simple macro builder and a complete programming environment called

integrity of the data. Lotus does not provide any special links to WordPro, although you can embed an Approach view into a 1-2-3 spreadsheet using OLE. Also, Approach has its own tools for creating form letters and labels.

There are a few nods toward web integration, but nothing of much substance. You can publish an Approach

IN DESIGN VIEW, APPROACH FORMS USE THIS DISTINCTIVE FLOATING PROPERTY INSPECTOR



A TYPICAL APPROACH APPLICATION

a database table or opening a connection to one of the supported server databases. If you are defining your own table, you get a conventional dialog where you enter field names, data types, field size, and special features like default values and validation rules, all presented in something close to plain English. A clever aspect is that even when using standard dBase IV or FoxPro data files, which do not support engine-level validation or referential integrity, Approach supplies these features. It does so by using a database container file, with a .APR extension, through which the underlying data is managed.

Once you have defined your data, Approach uses a form designer as the centre of operations. In Approach, the form designer is part of the main application window. Clicking a Browse

button activates the form so you can begin working with data. A single form is not usually sufficient, so you can add new pages that become tabs in the main view. Reports and queries are simply additional tabbed pages. Any form can serve as a query – clicking the Find button lets you enter example values into fields and search the database on those values.

Custom applications can be built in Approach. Like Microsoft it has a simple macro builder and a complete programming environment called LotusScript. Approach's interface is restrictive for developers, so you would not want to create advanced applications. It is also prone to flashing, jerky effects when used under program control, since the code is automating user actions.

On the face of it, Approach is highly suitable as the database manager in an office suite. It is also a handy tool for creating simple clients for server data, and has a driver for Lotus Notes. Unfortunately, Approach depends on its own database container to enforce rules and add features to database files, which is fine when working from within the application, but problematic when you want to work with the data from outside. You can work with the underlying tables, which are most likely to be in dBase format, but doing so risks breaking the

view as a jDoc document, a Java-based utility that creates an accurate but static reproduction of the data for viewing on the web. You can also save as HTML, which is preferable unless you need to preserve the exact layout of a report. There is a facility to bundle the Approach database container with its associated database files into a compressed .APT file, making it easier to work with if you need to access the data from an FTP (File Transfer Protocol) server.

The winning feature of Approach is that it is bundled as standard with SmartSuite, or can be bought standalone. It is adequate for everyday office tasks and makes an effort to be easy to use.

PCW DETAILS

★★★★

Price SmartSuite Millennium £439.45 (£374 exVAT)

Upgrade and Competitive Upgrade price £162.15 (£138 ex VAT)

Approach 97 £49.35 (£42 ex VAT)

Contact Lotus 0870 6006123

www.lotus.com

Good points Ease of use, uses standard underlying format

Bad points Poor suite integration, less powerful than Access

Conclusion Great value but not outstanding in its own right

FileMaker Pro 5



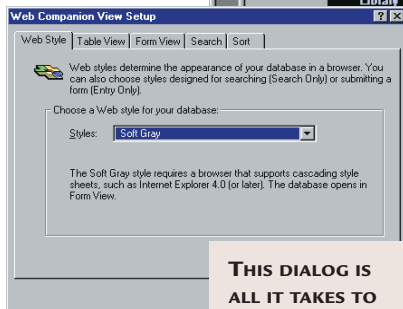
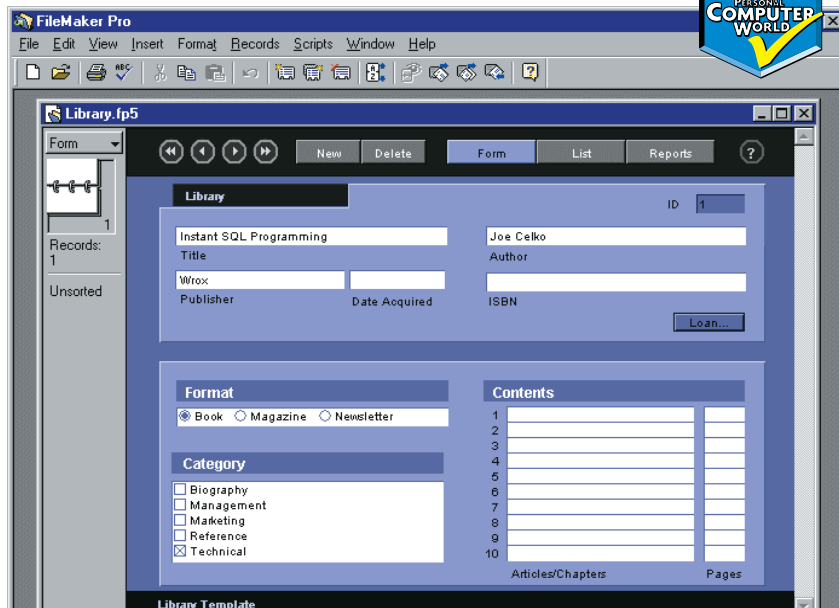
FileMaker was born on the Mac and brings that platform's ease-of-use philosophy to Windows. In version 5 some effort has been made to make it more Windows-like, but fortunately the interface changes are superficial. The Mac version keeps in step, making this the obvious choice if you want to share data on a mixed Windows-Mac network. Like Access, FileMaker is aimed at both novices and developers, although the primary focus is on providing a database manager that allows non-experts to manage data easily.

FileMaker's interface has a lot in common with Approach. A new database begins with a field definition dialog, then a form is automatically created. The interface is centred on FileMaker's form designer, which can be switched between Browse, Layout and Find modes. FileMaker was there before Approach, and of the two it is more accessible without compromising database management capabilities is more carefully thought-out.

FileMaker Pro has a native database format and is smart about how data is organised. A tricky decision in most database managers is how to choose the field size – too small and you end up with truncated names or obscure abbreviations; too large and there is a lot of wasted space. FileMaker has a variable field size, so if you define a field as Text, it can take up to 64,000 characters. There is no need for a separate Memo type. Another plus is that you do not need to define indexes. FileMaker does this on-the-fly, according to the queries created. These great features make designing a database more intuitive.

To design a form in FileMaker you select items from a tool panel, not floating but docked at the side of the form, and lay them out on a form with the mouse. Reports use the same layout tools. You can add many different layouts to a database, and switch between them via a drop-down menu.

FileMaker supports relational databases, but it pushes the flat-file type



THIS DIALOG IS ALL IT TAKES TO PUBLISH FILEMAKER DATA ON AN INTRANET. MOST, BUT NOT ALL THE STYLES REQUIRE IE

as far as it will go. Features like lookups enable a field in one table to be filled by looking up data from another, and repeating fields, where a single field can hold more than one value. It is best to avoid these features,

particularly repeating fields, and use related tables instead. FileMaker layouts can contain portals, or subforms, which show related data from another table.

Despite its ease-of-use, FileMaker is powerful. The basic file-sharing edition supports up to 10 users, but you can upgrade to a server version for 250 users. The maximum database size is 2GB. There is also a developer version that lets you extend the script library with your own functions, or deploy FileMaker applications using a runtime edition.

Version 5 has two significant features for Windows users. The first is an ODBC driver for FileMaker data. In previous versions it was all but impossible to read FileMaker databases other than with FileMaker. Now any application that supports ODBC can read data in FileMaker's format.

Next comes support for ActiveX automation, which lets you control FileMaker from programming tools like Visual Basic. Unfortunately FileMaker's implementation of this is poor – all you can do is run existing FileMaker scripts. However, it is an improvement on earlier versions.

Finally, the software has an integrated web server that makes it genuinely easy to publish data on an intranet or the web, if you have a permanent connection or an ISP that supports this feature. FileMaker uses XML and scripts to recreate layouts as web pages, with dynamic read-write access to the data. Think of this as a black box, since FileMaker is no easier than other web development tools if you want to customise this feature extensively. For immediate results though, it is superb.

FILEMAKER HAS A CONSERVATIVE DESIGN BUT HAS BEEN CAREFULLY THOUGHT OUT FOR NON-EXPERTS

PCW DETAILS



Price £233.82 (£199 exVAT)

Contact Filemaker 0845 6039100

www.filemaker.com

Good points Easy to use and powerful, with new ODBC driver

Bad points Mac origins and individualistic approach can get in the way

Conclusion The best blend of usability and performance

Corel Paradox 9

Paradox is another long-established product that began as a successful DOS database from Borland. It was a casualty of the migration to Windows, particularly since Borland changed it so drastically that the Windows version had little in common with its DOS predecessor. A couple of versions later Borland pulled out of the end-user application market and licensed Paradox to Corel, but the database still uses the Borland Database Engine, developed and maintained by Borland. This gives Paradox the same relationship to Delphi, Borland's premier development tool, that Microsoft Access has with Visual Basic. Corel does not bundle Paradox with all versions of the WordPerfect Office suite, but keeps it for the Professional and Enterprise versions or as a standalone purchase.

Of all the desktop products in this test, Paradox is the most perplexing for newcomers. Corel has worked hard to

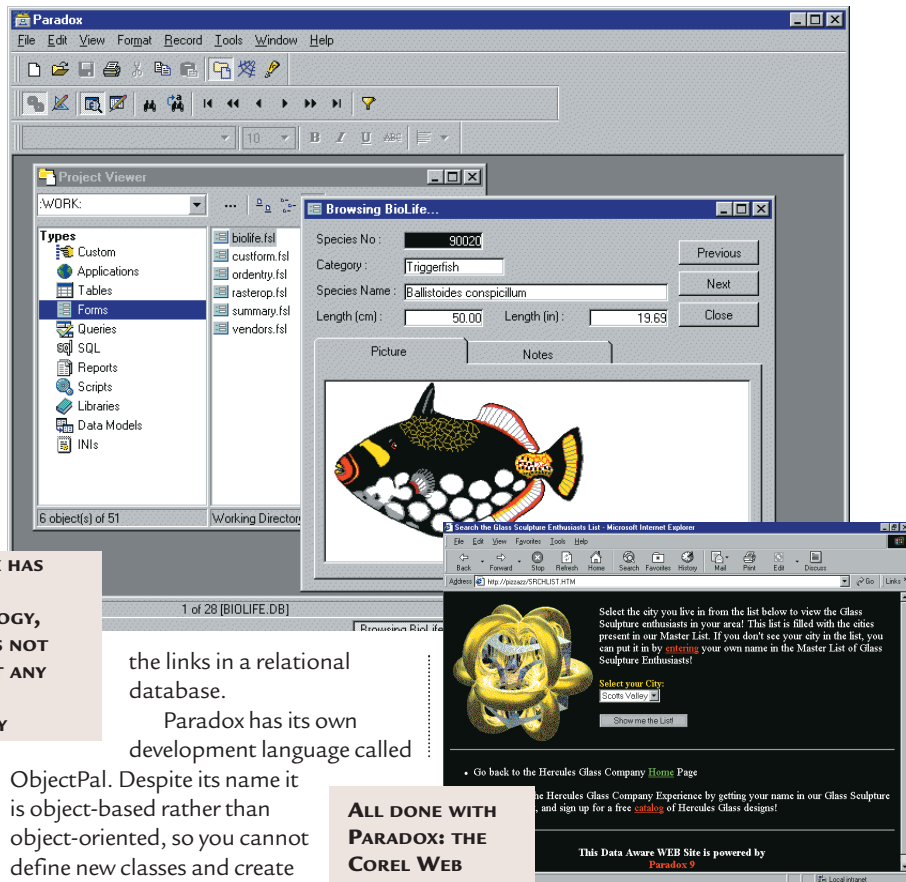
supply improved Experts, but has not succeeded in making it even remotely user-friendly. This is partly a jargon problem. In the table structure design dialog, the Text field type is called A, which stands for Alpha, while S means Short, for an integer up to 32,767. Paradox has two kinds of index, the primary key and secondary indexes. So to index a field you have to select a tab called Secondary Index, choose Add and type in a name, then select one or more fields to define the index – a rigmarole for a simple operation. The fact that you have to press Shift-F2 to edit a memo field is

hardly intuitive either. Paradox does not belong in an office suite where end users will encounter it, but should be positioned like Visual dBase and Visual FoxPro as a developer's tool.

For those who have the patience to learn Paradox, it is an outstanding desktop database manager. It is characterised by an advanced database format, with good support for referential integrity, and a comprehensive range of tools including two query builders, form and report designers, and a data model designer that lets you view and modify

PARADOX HAS SUPERB TECHNOLOGY, BUT DOES NOT EASILY FIT ANY MARKET CATEGORY

When it comes to the web, Paradox has some interesting features



the links in a relational database.

Paradox has its own development language called

ObjectPal. Despite its name it is object-based rather than object-oriented, so you cannot define new classes and create custom objects. Even so, it is powerful and well-structured. Its main disadvantage is that because it is unique to Paradox, there is not much incentive for developers to learn it. By contrast, VB is so widely used that Windows developers are almost compelled to learn it. Ironically, Corel has

licensed VBA but has not yet put it into Paradox.

When it comes to the web, Paradox has an interesting set

of features. In true Corel style there is a bewildering range of options. There is a bundled web server to which you can start saving HTML files exported from Paradox. You can save as static HTML, or as an HTTP template. In this case, the file contains the layout, but not the actual data. Custom tags in the template enable Corel web server to retrieve the data dynamically when the page is requested. You can also use the Corel Web Server Control, a web server ActiveX control which overrides the standalone Corel Web Server. Pop it on a form and

ALL DONE WITH PARADOX: THE COREL WEB SERVER CONTROL AT WORK

when the form is run so too is the web server.

Paradox 9 has yet another set of web tools, called JParadox. This includes a set of Java servlets and requires a web server that supports them, such as Sun's Java Web Server or any web server with JRun installed. A Paradox JDBC driver and a Web Form Designer utility let you design a form using data-aware controls connected to Paradox data, and publish it as a Java applet. This is great technology, but nobody can pretend it is easy to use.

PCW DETAILS



Price £146.88 (£125 ex VAT)

Contact Corel 0800 973189

www.corel.com

Good points An advanced database manager including great cross-platform web technology

Bad points Too complex to bundle with an Office suite. Proprietary ObjectPal language

Conclusion The problem for Paradox is that it is too hard for end users, while developers have plenty of other tools to choose from

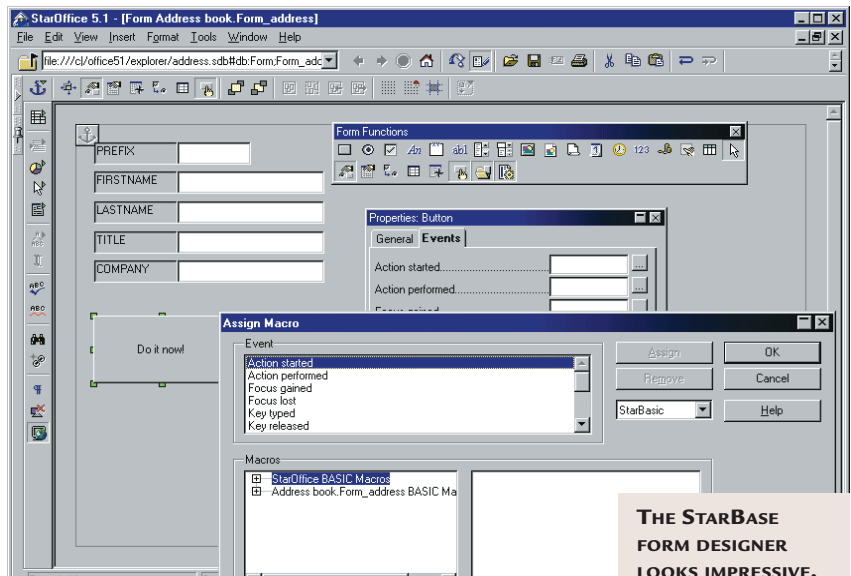
Sun StarBase 5.1

Lurking within StarOffice, the office suite acquired by Sun as an alternative to Microsoft Office, is the StarBase database manager. It can connect to a variety of database formats including Access, Oracle, DB2, or any JDBC or ODBC data source, along with a table designer, form designer with a sub-form facility, SQL-based Query builder, and report wizard. It sounds good and there is probably the making of a useful database module within StarOffice, but in the current version it is virtually unusable.

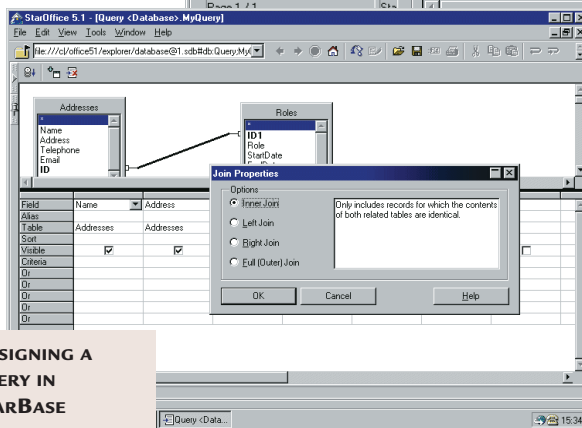
To explore the database features you choose New from the File menu and select Database. This presents a dialog where you can choose the database type. In the Windows version, there is a native StarBase type which stores data with a .RBX extension, but otherwise you can select from a number of types. Unless you choose the StarBase type, however, you cannot create a new database through StarBase, but only connect to an existing one. If you do choose StarBase you get a New Data Source dialog which lets you specify a file name and start from scratch.

Once you have chosen a data type, a window opens with icons for Forms, Queries, Reports and Tables. Double-clicking any of these drills down into the relevant section, which if you are starting a new database means an empty window. One option in the database window is SQL, available from a right-click menu, which lets you execute an SQL statement against the current database. This seems to be intended for commands that update or insert data rather than return results. We tried a Select statement which returned 'Command successfully executed', without providing any data to view.

The StarBase database designers, for tables and queries, are reasonably intuitive assuming you are familiar with



THE STARBASE FORM DESIGNER LOOKS IMPRESSIVE, BUT PROVED FRUSTRATING IN PRACTICE



DESIGNING A QUERY IN STARBASE

something like Microsoft Access. Field types for the native format include Text, Number, Boolean, Currency, Memo, Image, Decimal and Binary. You can define indexes including a primary key, set default values and mark fields as Required or Unique.

Making use of data was frustrating. There is a range of auto-pilots for common tasks, and while this was successful in producing a simple report, on other occasions

the auto-pilot failed to run. StarBase had difficulty displaying its form designer, and offered a blank text document without any database connection. We were able to get to the form designer with New - Form from the File menu. Forms have built-in controls for navigation, new and delete functions. You can also use the

Form Functions toolbar to add controls such as buttons. Controls fire a range of events such as Mouse pressed or Mouse moved, and you can link these to StarBasic macros.

Integration with StarOffice looks as if it is intended to be good, but it was hard to make it work. You can insert database fields in a StarOffice document, but it was quirky and frustrating.

Documentation, such as it is, is hard to find. If you are lucky it might pop up at the right time, otherwise it is a matter of searching the online help. There is no entry for Database in the main contents. StarBase is also unreliable. The interface is quirky, and we were afflicted from time to time by messages like: 'Error reading data from the database. Connection failed.' At the same time, this is clearly an ambitious product that has the makings of a standards-based and cross-platform database manager. Consider it a work in progress.

Database designers for tables and queries are reasonably intuitive

PCW DETAILS



Price Free download from www.sun.com/products/staroffice
Contact Sun 01276 451440
www.sun.com

Good points An ambitious product with potentially good connectivity and integration
Bad points Buggy and scarcely documented
Conclusion Do not use for real work yet

Beginner's guide

Database management is about organising information. It is not strictly correct to call an application like Microsoft Access a 'database'. Instead, it is a database management system (DMS). To confuse matters further, the same database may sometimes be accessed by more than one DMS. Many applications include some degree of database management, even when that is not their main focus. For example, email clients and PIMs (personal information managers) usually have an address book facility. You might also keep a list of addresses in Word, or a list of products and prices in Excel, in which case these too act as database managers.

These simple databases are usually a single list of records, where each record has a number of fields such as forename, surname, postcode and so on. A list like this is called a table. The database manager will make it easy to search the list, sort it in different ways, and create reports for printing out the information. Databases like these are called flat-file and they are very common.

The problem with a flat-file database is that it is inefficient and inflexible for certain types of data. The main problems come when you have a lot of repeated data, or when the data simply does not fit the flat-file structure. For example, if you had a database of vehicles you would probably find the same names cropping up frequently in the

Manufacturer field: Ford, BMW, Vauxhall and so on. It would be more efficient to have a code for each manufacturer, so you can use the code instead of the full name, and a second table listing the manufacturers and their codes. At this point it becomes a relational database, so called because you have more than one table and the tables have a relationship, in this case a common field called, for example, 'ManufacturerCode'. Instantly the database becomes more powerful. For instance, you can now easily add information for each manufacturer like contact details, brief history, current turnover or whatever.

Some information simply cannot be represented in a flat-file database. A classic example is a list of students and classes. Each class involves more than one student, and each student attends more than one class. There is no sensible way to store this data in a single table. In a relational system, it takes three tables, one for students, one for classes, and one to store the links between them.

Relational databases are vulnerable to corruption. The system depends on valid links. Duplicate or missing entries in any of

the tables destroy the integrity of the data. This is called Referential Integrity, and most database managers have built-in features that enforce it, preventing errors of this kind.

The other challenge with relational data is extracting and updating the data successfully. The industry standard is a language called SQL (Structured Query Language), and most systems allow you to use it, although there are annoying variations between different implementations.

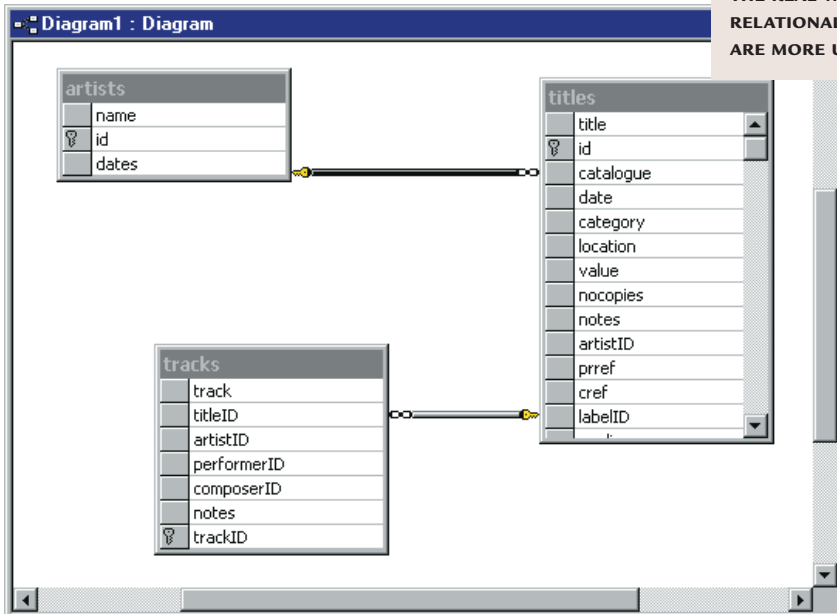
Another key feature is transaction management. On systems with several tables, it is often important to treat a series of updates to individual tables as a single transaction, which can be completed or cancelled.

The relational system is mature and well understood, but it is not the only way to manage data. Another important development is the object database, which fits well with modern object-oriented programming. There are specialist object database managers, and relational database vendors are working to adapt their systems to store objects easily and efficiently.

Finally, there is an important distinction between file-based and client/server database management. These apply when more than one workstation has access to a shared database.

Some information cannot be represented in a flat-file database

IT WOULD BE SIMPLER IF ALL DATABASES WERE FLAT-FILE, BUT IN THE REAL WORLD RELATIONAL DATABASES ARE MORE USEFUL



In a file-based system, a separate database manager runs on each workstation, reading a common database file on a file server. Client/server systems, on the other hand, have a single database management application running on the server, and the workstations communicate with this application rather than reading the data directly.

A variant on this is a multi-tier system, where clients communicate with intermediate software, which in turn communicates with the server. Such systems increase the complexity, but because they are more adaptable and scalable they are gradually replacing file-based solutions.

Web-enabled databases

Publishing data on the web enables access from anywhere and use of a universal, cross-platform client. There are strong advantages for public-facing sites and private intranets, and anyone considering a new database project should look carefully at a web-based solution.

Web pages are constructed using HTML, which is plain text marked up with tags to give it rich formatting. Database managers, on the other hand present dynamic information, which may change minute by minute as records are added, modified and deleted. There are two options for publishing data on the web. The simplest is to convert data into HTML and post it on a web server as simple HTML. This has three substantial disadvantages. First, the data is only as up-to-date as the last time the page was uploaded,

although you can overcome this to some extent by automating the process.

Second, it is hard to avoid pages that are too large, or require the user to navigate numerous pages before finding the required data.

Third, pages are read-only. Even so, for small read-only data that changes rarely, uploading HTML pages is effective.

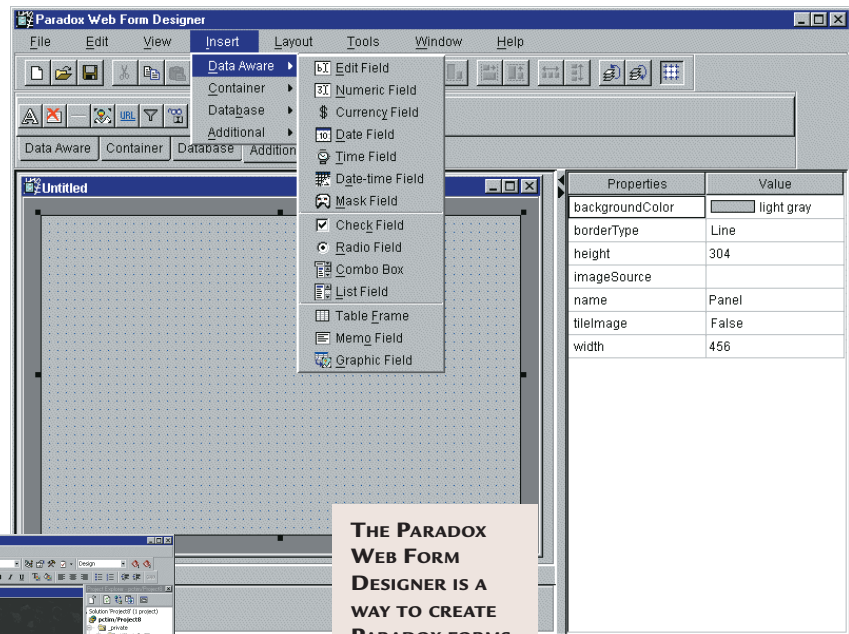
Another option is to have software that generates HTML on-the-fly, in response to queries entered on web forms. A script or executable runs on the web server, where it accepts queries or updates, accesses data programmatically, and generates results

which are fed back to the browser as HTML. Perl is popular for this work, since it is web-savvy, runs well on Unix-like operating systems as well as Windows, and has several libraries available for database work. You can use something like mSQL as the database engine and get all this up and running for free, aside

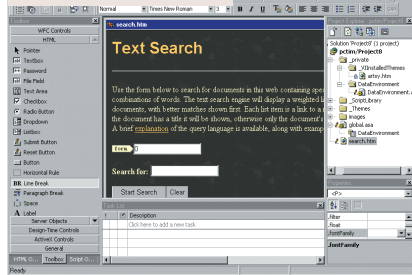
from ISP costs, or connect to any database server via ODBC or other library code. The snag is that it is fairly low-level stuff, not to be undertaken casually.

A number of approaches make it easier. One is ASP (Active Server Pages), a feature of Microsoft's Internet

Some tools make web publishing easy. Prime examples are the database products that have an inbuilt web server, such as FileMaker Pro and Corel Paradox. Using these systems, you need do little more than check a box to have a database accessible by a web



VISUAL INTERDEV IS FOR DEVELOPING DYNAMIC WEBSITES, BUT IT IS NOT THE EASIEST OF TOOLS



THE PARADOX WEB FORM DESIGNER IS A WAY TO CREATE PARADOX FORMS AS JAVA APPLETS

browser over TCP/IP. But going beyond what the system provides is complex.

Information Server that parses HTML pages to run server-side scripts before delivering them to the

browser. These scripts, which can be written in Visual Basic Script or JavaScript, can access databases via ADO (Advanced Data Objects), which includes drivers for SQL Server, JET, or any ODBC data source. Microsoft's Visual InterDev is a tool for working

with ASP, as is Macromedia's Drumbeat, which contains many pre-written scripts for rapid development.

Microsoft FrontPage has database features which rely on ASP technology. Overall, ASP is easier than Perl, but still not for beginners. A similar approach is taken by Allaire's Cold Fusion which, unlike ASP, runs on several platforms including Windows, Solaris and Linux.

Web compromises

Before getting totally carried away by web database publishing, it is worth looking at the compromises involved. Things you can take for granted in a conventional application are either difficult or not available, things like pixel-precise control of the display, modal dialogs, and rich clients that have access to all the features of the OS.

Traditional applications have to be completely redesigned to fit a page-based interface rather than one based on WIMP (windows, icons, menus and pointers). Also, instead of a single persistent connection between a user and a database server, the web model is stateless. All the web server sees is intermittent requests for data along with parameters passed from the browser. Web applications have to overcome this by using some technique to track a user's activities between logging in and drifting off the site, usually involving cookies,

Overall, ASP is easier than Perl, but still not for beginners

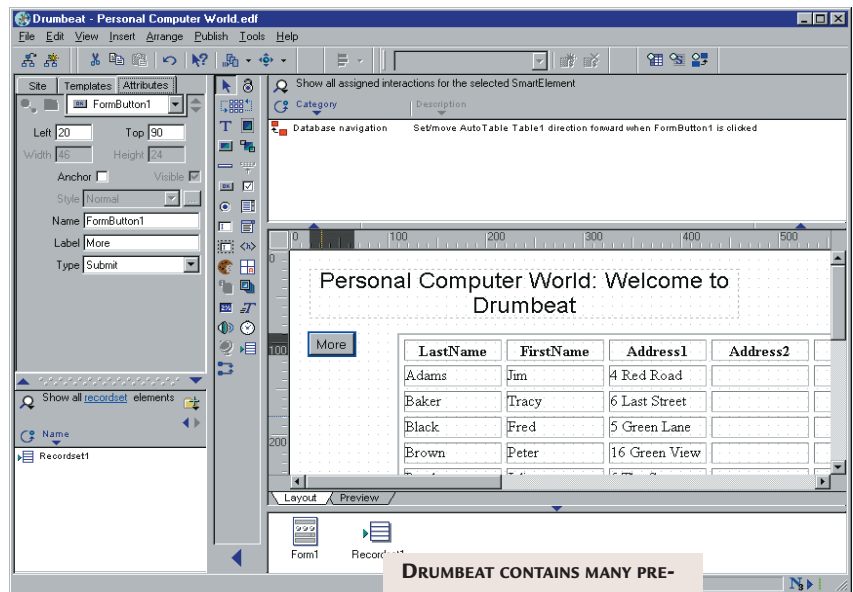
which are tracking codes stored on the client, or by using extended parameters to exchange identification codes with each web request.

Managing data through a web browser and web server is more complex than the traditional approach, so the compelling attractions of the web do have a cost.

One way to obtain more capable clients is to run Java applets or ActiveX components on the client machine. In this scenario, the browser is used to host an application that has its own means of making data connections and interacting with the user.

Microsoft's Data Access Pages work like this using ActiveX, or you can build data-aware Java applets using any number of Java development tools including Inprise JBuilder, Symantec Visual Café or IBM VisualAge. The weakness of the ActiveX approach is that you are limited to Microsoft Internet Explorer 5.0 running on Windows. Java solutions can work well, although it is more restrictive on clients than a system that delivers pure HTML.

There is a place for both client-side and server-side processing in web database applications, but in general it pays to exploit the web model to its fullest by keeping application logic and data access components on the server and supporting the widest possible range of clients. That way, you can exploit browser features like client-side JavaScript and Dynamic HTML while also providing a pure HTML interface for universal access, perhaps from PDA clients as well as full-featured web browsers.



DRUMBEAT CONTAINS MANY PRE-WRITTEN SCRIPTS FOR PUBLISHING DATABASES ON THE WEB

Server components

At the high end, web database publishing and old-style database applications are coming together. You can do this by using server-side components which can be accessed by conventional clients such as Windows applications, or by web applications. The idea is to reduce scripting to a minimum, on the grounds that script runs slowly and is hard to maintain, particularly when mixed with HTML in a web page. Application logic and data access is encoded into components, and for maximum scalability these can be managed by a transaction server. Transaction servers are intelligent about matters like sharing a single database connection between several users, or keeping an object instance in memory so it

can be re-used. You can also define a sequence of operations as part of a transaction, so that if need be it can be undone as a whole.

The two dominant technologies for server-side components are Java and COM (Component Object Model). Java Servlets are web server extensions that run either on a Java web server or on any web server supported by JRun, an add-on from Allaire designed for this purpose. Servlets can do data access using Java technologies such as JDBC (Java Database Connectivity). Most leading server databases have JDBC drivers, or you can use a JDBC-ODBC bridge to access ODBC data sources. Servlets can be used in tandem with JSP (Java Server Pages), a Java-based equivalent to Microsoft's ASP.

THERE ARE SEVERAL PERL LIBRARIES AVAILABLE FOR DATABASE WORK



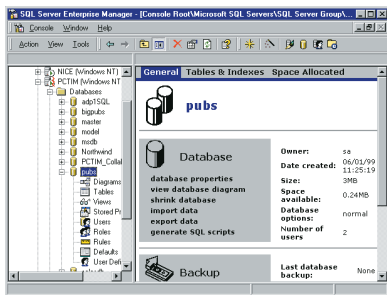
The COM solution exploits the ability of ASP to instantiate COM objects on the server.

COM is a Microsoft technology and is perceived as Windows-only although some effort has been made to support it on other platforms. The advantage of COM for Windows developers is that you can adapt or create Visual Basic, Visual C++ or Delphi code, using familiar data access techniques, and compile it as COM components. You can host these in Microsoft Transaction Server, also known as COM+, which is an integral part of Windows 2000.

There may seem to be a bewildering array of options for web deployment of database solutions, but that is because it is the current hot spot, in contrast to the moribund desktop database arena.

High-end server databases

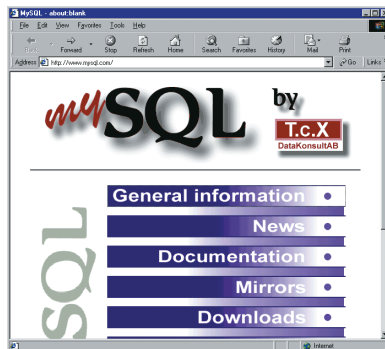
Although the main focus of this group test is on desktop database managers, it is important to keep half an eye on where you might go if you want to scale up to a server database engine. The drive towards web development means that may be soon. Using a server database does not necessarily mean abandoning your favourite desktop system. Server database systems do not work on their own, but require some kind of client, and with the partial exception of FileMaker Pro, all the desktop systems have connectivity features that let them act as clients to each of the server systems described here. Having said that, it is more common to find custom-built clients for this kind of database. All of them are also well suited to form the database layer of a web application.



Microsoft SQL Server

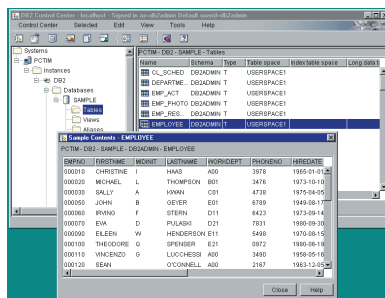
Microsoft may dominate client OSs, but in server databases it has been playing catch-up for many years. Ironically, one factor holding it back is that it only runs on Windows NT. It is still NT-only, but since version 7.0 SQL Server has been gaining ground as an obvious choice for the next step up from Microsoft Access or other file-based systems. The appeal of version 7.0 is partly that it is easier to use, since you can now use Access to manage an SQL Server database. There is a version for Windows 95 and 98. Another irritation, that of having to set the maximum size of a database, has been removed. Best of all, a cut-down version can be freely deployed, setting it apart from most other databases of this type.

SQL Server has been criticised in the past for its lack of scalability, but the Enterprise edition supports up to 32 processors and databases of a maximum theoretical size of over a million Terabytes, so that is no longer valid for most firms.



MySQL

MySQL is ideal for use on websites. Supported platforms include Linux and Windows and, apart from the Windows version, it is free for non-commercial use or as the database for a website. There are extensions for Hypertext Pre-Processor, which is another way to do server-side scripting, as well as for Perl. Java developers can use a JDBC driver. The main snag with MySQL is that you need to be happy working with command-line tools, since it does not come with graphical administration utilities. Having said that, there is enthusiastic user support for MySQL so a browse around the web might turn up some handy Java utilities.

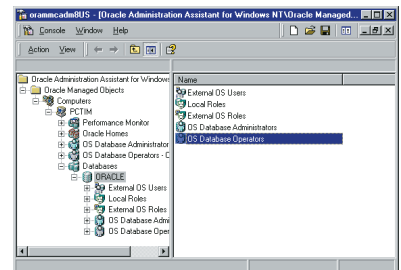


IBM DB2 Universal

IBM's server database runs on a wide range of systems including Windows 95 and NT, Linux, Solaris and AS/400 right up to high-end systems such as the OS/390. A personal Developers' Edition is available for free download. DB2 is solid, mature database technology that integrates with a range of IBM's hardware and software. There is support for replication, data warehousing, data mining, online analytical processing (OLAP), and large objects such as graphics or multimedia data. DB2 extenders are specialist extended data

types with many potential applications. DB2 is also characterised by strong Java support which translates to good web application support as well.

For Windows developers, the tools are not as easy to use as those for SQL Server, and while there is an ODBC driver there is no native OLEDB provider, for those wanting to exploit the latest Windows database API. It is also more expensive to deploy. On the other hand, DB2 scores well on the factors that count most, high availability and scalability.



Oracle 8i

Oracle is a dedicated database company and 8i runs on NT, and several Unix platforms including Solaris, AIX, HP-UX and Linux. The company has a curious relationship with Windows, taking every opportunity to berate its quality while providing strong support for the platform.

Oracle has gone even further than IBM in integrating Java into the database server. Oracle 8i has a Java Virtual Machine that runs within the server address space, for efficient data access from Java objects. Stored procedures can be written in Java. Three JDBC drivers are tuned for different purposes.

Oracle 8i comes in Standard, Enterprise, Workstation and Lite versions, the last being aimed at laptop or PDA users who want to synchronise data with corporate servers. Like DB2, Oracle is excellent for those wanting to move beyond Windows, but is more expensive to deploy than SQL Server.

PCW DETAILS

- Microsoft SQL Server**
Contact www.microsoft.com/sql/
- MySQL**
Contact www.mysql.com
- DB2 Universal**
Contact www.ibm.com/data/
- Oracle**
Contact www.oracle.com

Editor's Choice

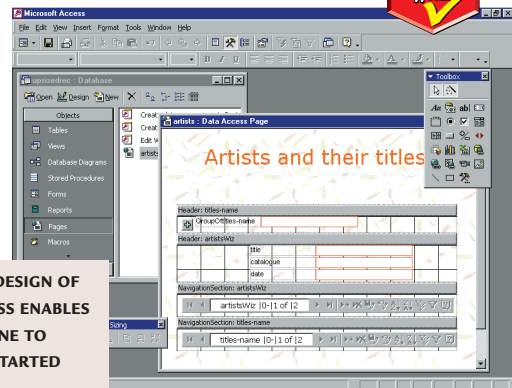
The challenge with desktop database products is to provide a full range of features for managing relational data without losing the non-expert user in a jungle of incomprehensible dialog boxes. While all but one of the products covered here are competent, only two are outstanding.

➔ **The Editor's Choice** is Microsoft Access. Although it could be better for novices, Access is sufficiently well-designed that anyone can get started, and sufficiently powerful that it can accommodate most desktop tasks. Plus points are the ability to use SQL Server as a native database source, which makes this the easiest way yet to migrate to a client/server system, the use of the widely understood Visual Basic for program code, and the comfortable fit with other Microsoft technologies such as Active Server Pages for intranet and web deployment.

➔ **Highly Commended** is FileMaker Pro from FileMaker. Its most impressive

feature is the thought that has gone into making the business of database management a common sense matter that most people can easily accomplish, at least for simple flat-file data. It is a little less powerful than Access, particularly in the scripting area, but there is an upgrade path to the server version, and FileMaker's web deployment feature is the easiest way yet to publish dynamic web pages.

➔ **Corel Paradox 9.0** deserves a special mention. This is a frustrating product that cannot be recommended except to developers, but with its extensive web integration features, it points the way forward to database management that is cross-platform and database-independent. The future of data management is web-based, and advanced features like these will matter



THE DESIGN OF ACCESS ENABLES ANYONE TO GET STARTED

increasingly as the era of desktop databases comes towards its close.

For information on ASP, ADO and COM, explore www.microsoft.com or try to grab an MSDN library CD set for online documentation.

Information about ColdFusion and JRun is at www.allaire.com. Both have cut-down versions for free download.

The best starting point for Java technology is www.java.sun.com.

MANUFACTURER	MICROSOFT	LOTUS CORPORATION	FILEMAKER	COREL	SUN MICROSYSTEMS
PRODUCT NAME	ACCESS 2000	APPROACH MILLENNIUM	FILEMAKER PRO 5	PARADOX 9.0	STARBASE
Tel no	0345 002000	0870 600 6123	0845 603 9100	0800 973189	01276 451440
URL	www.microsoft.com	www.lotus.com	www.filemaker.com	www.corel.com	www.sun.com
Price (ex VAT)	£326.43 (£277.81)	SmartSuite £439.45 (£374)	£233.82 (£199)	£146.88 (£125)	Free download
FEATURES					
Client/server option	✓	✗	✓	✗	✗
Export to HTML	✓	✓	✓	✓	✗
Publish dynamic web pages	✓	✗	✓	✓	✗
JDBC driver	✗	✗	✗	✓	✗
Integrated web server	✗	✗	✓	✓	✗
Max database size	2GB	2GB	2GB	Not stated	Not stated
Integrated security	✓	✓	✓	✓	✓
Native data format	MDB or SQL Server	dBase	FileMaker	Paradox	StarBase
Connect to ODBC	✓	✓	Import only	✓	✓
ODBC driver	✓	✗	✓	✓	✓
COM automation server	✓	✗	✓	✓	✗
Programming language	Visual Basic	LotusScript	✗	ObjectPal	StarBasic
Script editor	✓	✓	✓	✗	✗
Runtime version available	✓	✗	✓	✓	✗
SQL support	✓	✓	✗	✓	✓
Linux version	✗	✗	✗	✗	✓
Macintosh version	✗	✗	✓	✗	✓

DESKTOP PCs

Due to the fast-moving nature of the PC industry, we can only recommend particular PCs in the month we have seen them. Prices change almost weekly, as component prices from third-party suppliers fluctuate according to availability. So, for the best current PC buy, for instance, look at our most recent group tests.

It always pays to take a little care when buying a PC or in fact any hardware or software. For *PCW*'s guide to buying direct, see our buying advice page. And don't forget to use the *PCW* Order Form.

Everyone's ideal PC will have a different mix of components, with gamers needing a very good 3D graphics card, probably a 3D sound card and excellent speakers, while business users will need a good monitor and plenty of RAM.

ENTRY-LEVEL PCs

Budget-conscious buyers might consider a non-Intel processor such as an AMD K6-2 or K6-III. But be aware that if you choose a Socket 7 chip, you'll only be able to upgrade to an AMD processor in future. Most Celerons are only being sold in Socket 370 format rather than in Slot 1 format, so if you get a Socket 370 processor you won't be able to upgrade later to a PIII. Check what processor format you will get when you order. If you are only offered a Socket 370 processor, insist on a Slot 1 board and 'Sloocket' combination with 100MHz of RAM to maximise the upgrade potential. Look at September's group test for £699 (inc VAT) PCs.

We would recommend the following specification:

- AMD K6-2 400 or Intel Celeron 400 processor
- 64MB RAM
- 6.4GB hard drive
- Graphics card with 8MB video RAM
- 15in monitor
- CD-ROM drive, speakers, modem.

Expect to pay around £599 (ex VAT) for this configuration, but you may have to pay extra for a sound card, speakers or a modem.

MID-RANGE PCs

In the mid-range, around £1,000 (ex VAT) will get you a good all-round PC. The introduction of higher-speed PIIIs has meant the slower PIIIs have dropped in price, bringing them into this mid-range category. However, the stunning result of the K6-III, and its low price, make it worth serious consideration.

Look for a minimum of:

- Intel PIII or AMD K6-III 500MHz processor
- 128MB RAM
- 12GB hard disk
- Good 3D graphics card with 16MB video RAM
- 17in monitor
- DVD-ROM drive
- Sound card, speakers, 56K modem.

For machines aimed at the novice user – costing no more than £999 ex VAT – see this month's PC group test.

HIGH-END PCs

If you're after a state-of-the-art machine, be prepared to spend around £1,500 to £2,000 (ex VAT). What you require at this price will be specific to your needs, depending on how you intend to use the machine. However, as a basic specification we would want:

- PIII 600 or Athlon 600MHz
- 128MB 100MHz RAM
- 20GB hard drive
- Good 3D graphics card with 32MB video RAM
- 19in monitor
- DVD-ROM drive
- Sound card, speakers, 56K modem
- Bundled office suite

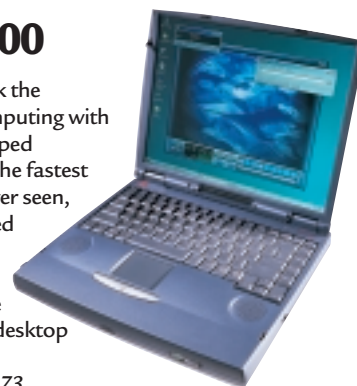
All product prices are inclusive of VAT and correct at time of going to press

HIGH-END NOTEBOOK

Hi-Grade Notino AS7400

Hi-Grade has pushed back the boundaries of mobile computing with the first Pentium III-equipped notebook. Besides being the fastest mobile computer we've ever seen, the AS7400 is fully featured with 160MB of RAM, a 10GB hard disk and a DVD-ROM drive. If you're looking for a high-power desktop replacement, this is it.

► PCW December 1999, p73



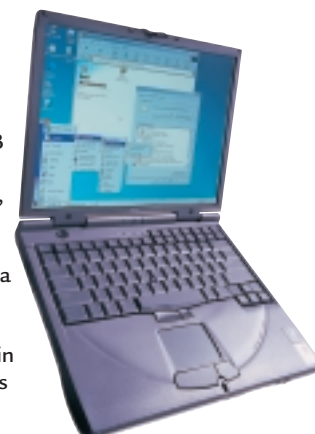
Price £2,113.82 Contact Hi-Grade 020 8532 6100 www.higrade.com

MID-RANGE NOTEBOOK

Dell Inspiron 3700

The Dell Inspiron 3700 – with its Celeron 466MHz processor, 128MB of RAM and excellent 14.1in active matrix LCD screen – is not only light, it's also pleasing to the eye. The bundled Margi DVD-to-Go PC card even lets you watch DVD movies on a standard television, while Dell's exclusive ExpressCharge cuts the Lithium Ion battery's charging time in half, with no detrimental effect on its operational life.

► PCW January 2000, p77



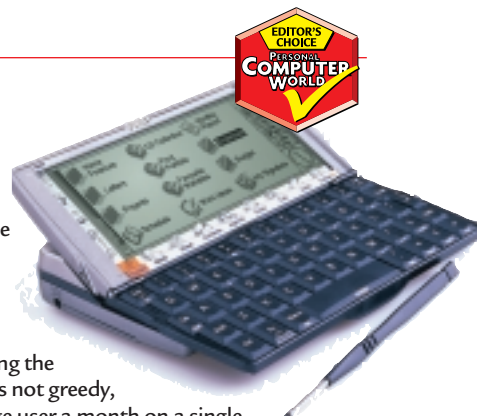
Price £1,702.57 Contact Dell 0870 907 5681 www.dell.com

PDA

Psion Series 5mx

Retaining the Series 5's good looks, Psion has doubled the memory size and processor speed to 16MB and 37MHz respectively, and built email software into the ROM as well as improving the screen and backlight. It's not greedy, either, lasting the average user a month on a single pair of AA batteries.

► PCW August 1999, p92



Price £429.99 Contact Psion 0990 1430503 www.pSION.com

COLOUR INKJET

Hewlett-Packard DeskJet 895CXi

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced. Even its 'econofast' mode could be used for vital documents, saving both time and ink. It takes a huge range of papers and replacing ink cartridges is a breeze.

▶▶▶ PCW October 1999, p177



Price £233.82 **Contact** Hewlett-Packard 0990 474747 www.europe.hp.com

COLOUR PHOTO PRINTER

Epson Stylus Photo 750

Easy installation, a five-colour cartridge for photo printing and feature-rich software make this printer an attractive proposition. Its photo reproduction could not be faulted and its job turnaround is impressively fast, too. Black text on photocopy paper was a little disappointing, but the price should suit most pockets.

▶▶▶ PCW October 1999, p180



Price £198 **Contact** Epson 0800 220 546 www.epson.co.uk

BUDGET LASER PRINTER

Brother HL-1250

This compact machine has everything you could reasonably ask for at the price, but Brother has gone one step further with the inclusion of both parallel and USB ports. Overall this is an excellent printer with a low running cost – a great buy at the low end of the spectrum and it's even easy to set up.

▶▶▶ See this month's printer group test



Price £245.58 (£209 ex VAT) **Contact** Simply 08707 297 366 www.brother.com

BUSINESS LASER PRINTER

Hewlett-Packard LaserJet 4050TN

Hewlett-Packard dominates the laser printer market and it's easy to understand why when you see the output from the LaserJet 4050TN. Its 1,200dpi resolution is outstanding, and with a 133MHz NEC processor combined with 16MB of RAM it can turn out an impressive 16ppm. On top of all that, it comes network-ready as standard.

▶▶▶ PCW September 1999, p96



Price £1,580.38 **Contact** HP 0990 474747 www.europe.hp.com

MULTIFUNCTION DEVICE

Hewlett-Packard Office Jet R45

The Office Jet R45 is an excellent colour multifunction device. It has a colour inkjet printer, with a resolution of 600dpi, a colour scanner and a fax all in one. Its colour output is impressively rich and vibrant. The 30bit scanner supports a maximum optical resolution of 600 x 2,400dpi and is fast, easy to use, and rendered excellent results.

▶▶▶ PCW November 1999, p96



Price £407 **Contact** Hewlett-Packard 0990 474747 www.europe.hp.com

FLATBED SCANNER

Epson GT-7000 USB

This 600dpi scanner performed excellently in all of our tests, with good colour accuracy, text reproduction and picture quality. USB installation is a breeze and we were impressed with the robust build quality. The hinged lid will close flat to accommodate thick targets – all in all a great unit.

▶▶▶ PCW November 1999, p191



Price £148 **Contact** Epson 0800 220 546 www.epson.co.uk

DIGITAL CAMERA

Nikon Coolpix 700

Both physical controls and the on-screen menu system of the Coolpix 700 are well laid out, so the powerful feature set is a boon rather than a barrier between you and the shots you want. The results from the Coolpix's 2.1 megapixel CCD are truly impressive. The camera produced wonderfully clean, detailed, natural-looking images at 1,600 x 1,200.

► PCW January 2000, p175



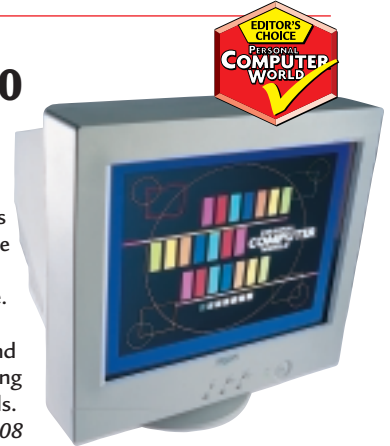
Price £499 (£425 ex VAT) Contact Nikon 0800 230 220 www.nikon.co.uk

MONITOR

Taxan Ergovision 980

The Taxan Ergovision 980 is based on the 19in Mitsubishi Natural Flat Diamondtron tube. It sports superb image quality and the array of OSD controls is intuitive and comprehensive. There's a built-in USB hub, with two ports on the left and right sides of the base, making it easy to connect peripherals.

► PCW November 1999, p208



Price £586.32 Contact Taxan 01344 484646 www.taxan.co.uk

MODEM

3Com 56K Professional Message Modem

This excellent self-memory modem is flash-upgradable to V.90. It has 2MB of memory – enough for either 20 minutes of voice messages or 50 fax sheets, or a combination of both – and this is upgradable to 4MB. You can retrieve the voice messages remotely using a PIN and the modem is easy to set up.

► PCW August 1999, p191



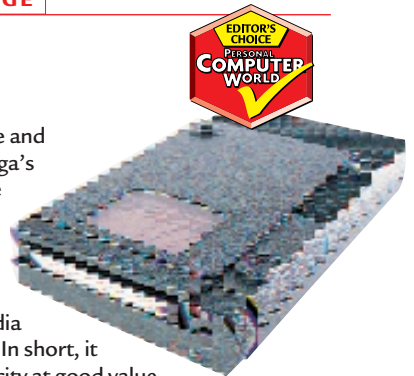
Price £129 Contact 3Com UK 0800 225 252 www.3com.co.uk

REMOVABLE STORAGE

Iomega Jaz 2

If you need top performance and storage capacity, then Iomega's 2GB Jaz drive is the only one to go for. Its speed makes it ideal for a wide range of applications and it is fully compatible with 1GB cartridges, while the Jaz media feels more solid than most. In short, it provides large storage capacity at good value.

► PCW June 1999, p168



Price £299 Contact Iomega 0800 973194 www.iomega.com

SOUND CARD

Creative Labs SB Live! Platinum

The SoundBlaster Live! Platinum is exactly what gamers and budding PC musicians have been asking for – great sound quality and excellent bundled software make this one a winner. The inclusion of the LiveBay front panel makes fumbling around the back of your PC for the right connection a thing of the past. We think it's the best sound product ever.

► See this month's reviews



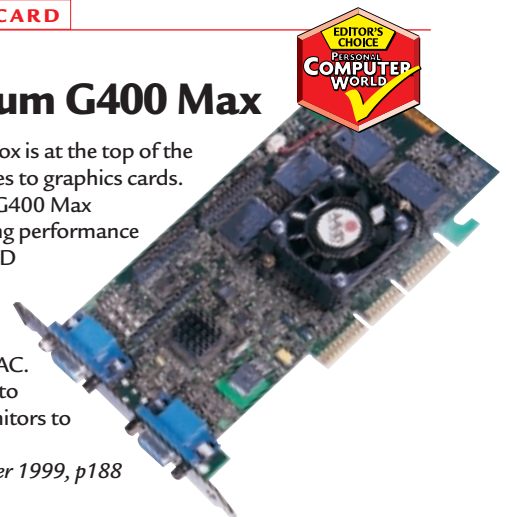
Price £151.58 Contact Creative Labs 01189 344744 www.soundblaster.com

GRAPHICS CARD

Matrox Millennium G400 Max

Once again Matrox is at the top of the tree when it comes to graphics cards. The Millennium G400 Max produces stunning performance in both 2D and 3D environments. It has 32MB of SGRAM and a 360MHz RAMDAC. It's also possible to connect two monitors to the card.

► PCW December 1999, p188



Price £186.82 Contact Matrox 01753 665500 www.matrox.com

ACCOUNTING

Intuit Quickbooks 6



Touted as the easiest accounting package for small businesses, QuickBooks has a long history and a large user base. Version 6 is the first 32bit incarnation. It even monitors company performance and sounds the alarm should you fall behind.



►► PCW November 1999, p174

Price £199 (Pro version) **Contact** Intuit 0800 585058 www.intuit.com

PERSONAL FINANCE

Microsoft Money 2000



Money 2000 is an excellent product, which is easy to use and includes best-of-breed support for online banking. The inclusion of Money Express – which warns of any forthcoming bills when you switch on the computer – is an added bonus.



►► See this month's reviews

Price £29.99 **Contact** Microsoft 0345 002000 www.microsoft.com

DATABASE

Microsoft Access 2000



This industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 2000 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.



►► See this month's Database group test

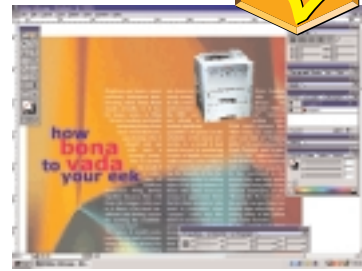
Price £326 **Contact** Microsoft 0345 002000 www.microsoft.com

DTP

Adobe InDesign



Seamless integration with PhotoShop and Illustrator, as well as multi-line text formatting, make InDesign a serious contender to knock QuarkXPress off its professional DTP throne. Time-saving features and a competitive price make it an attractive proposition.



►► PCW August 1999, p87

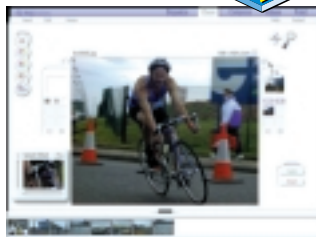
Price £468.83 **Contact** Adobe 020 8606 4000 www.adobe.com

IMAGE EDITING

Kai's Photo Soap 2



Kai's Photo Soap 2 not only looks fantastic, but it also offers great tools for organising, viewing and sharing photo albums – something that digital camera users will come to appreciate as their archives expand. All of the built-in tools are not only effective, but a pleasure to use – especially the enhance filters, which produce consistently good results with a range of images.



►► PCW January 2000, p198

Price £29.99 **Contact** Software Warehouse 0800 0355 355

DRAWING

Adobe Illustrator 8



Illustrator has once again taken the top spot among drawing packages, through its introduction of bold creative tools like the new Pencil Tool, Art Brushes and the Gradient Mesh Tool, to name but a few. If Adobe's new page-layout application – InDesign – takes off, the productivity gains from interoperability between InDesign, Photoshop and Illustrator will be hard to resist.



►► PCW September 1999, p165

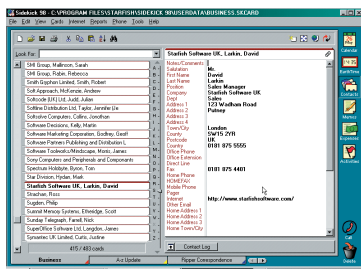
Price £257.32 **Contact** Adobe 020 8606 4001 www.adobe.com

INFORMATION MANAGERS

Starfish SideKick 99



SideKick is flexible enough to store information about almost anything, yet it remains true to its diary and contact management roots. Its shallow learning curve and affordable price make it an excellent choice for newcomers.



PCW August 1999, p176

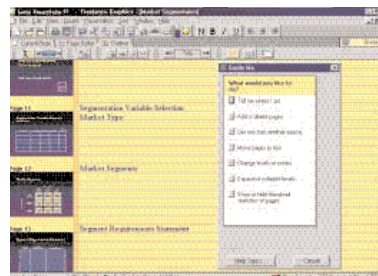
Price £39.99 Contact Starfish 020 8875 4444 www.starfish.com

PRESENTATION GRAPHICS

Lotus Freelance Graphics



Lotus' offering is our choice for electronic presentations. However, your decision may rest on which office suite you own or are considering, and as part of Office 97, PowerPoint won't let you down.



PCW March 1998, p200

Price £49.35 Contact Lotus 01784 445808 www.lotus.com

OFFICE SUITES

Microsoft Office 2000 Standard Edition

With the 2000 release, Microsoft upgraded its all-conquering office suite to offer more in the way of web and intranet integration. Simply because it offers the full selection of the most widely-used apps, it's hard to turn away from Office, even in the face of stiff price-cutting competition from Lotus and Corel.



PCW June 1999, p112

Price £475.21 Contact Microsoft 0345 002000 www.microsoft.com

WEB DESIGN

Macromedia Dreamweaver 2



An attractive and easy-to-use interface makes this great for those looking for something with a little more power. Good table handling and extensive formatting options on a single, centralised property inspector, make it a joy to use.



PCW December 1999, p203

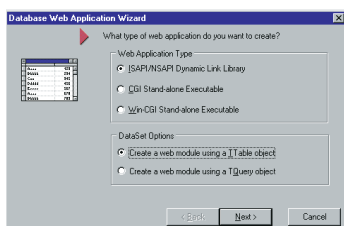
Price £269.70 Contact Computers Unlimited 020 8358 5857

PROGRAMMING TOOL

Inprise Delphi 4



Delphi is not a cross-platform product, but does let you build browser-independent web applications. It reaches all the way from RAD business applications to fast graphics using DirectX. It beats Visual C++ on ease of use, and Visual Basic on performance.



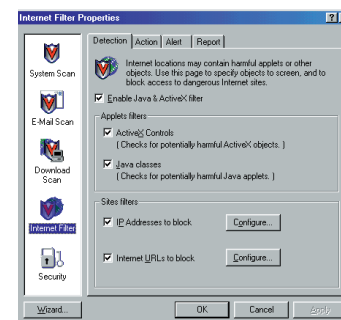
PCW April 1999, p198

Price from £99 to £1,999 Contact Inprise 0118 932 0022 www.inprise.com

ANTI-VIRUS

McAfee VirusScan Platinum

The background scanning in McAfee VirusScan Platinum checks mail attachments, Internet downloads and even ActiveX and Java applets for comprehensive protection.



PCW July 1999, p86

Price £59.95 Contact Network Associates 01753 827500 www.nai.com



hands on

contents

Feeling a bit porky after all the turkey and Christmas pudding? Let our Hands On writers give you a technical workout.

In the hardware column Gordon Laing tries to **fry his motherboard** in an attempt to get the latest socketed PIII chips working on his dual-Celeron board [p252].

Meanwhile, Bob Walder does a bit of hand-holding for novices struggling to get their PCs talking to each other over a **Windows network** [p267].

Sound maestro Steve Helstrip is having a blast with the **new Live! card** from Creative [p256] and, following a sneak peak at the **new Psion 7**, Mark Whitehorn rejoices that the company has finally embraced open standards for adding peripherals to its palmtops [p235].

In our **Perl workshop** Nigel Whitfield gets you off the starting blocks with his beginners' guide to this nifty programming language [p218].

Alas, this month is the swan song for the OS/2, Mac and Internet columns. In future, Internet issues will be covered in the networks and web development columns, while new exciting columns are also on the way.

NIALL MAGENNIS, FEATURES EDITOR
NIALL_MAGENNIS@VNU.CO.UK

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252 Hardware

Gordon Laing checks out the E numbers in Intel's new Pentium III chips, the Coppermines, and updates you on the progress of his dual-Celeron system

267 Networks

Need to link up two PCs? Bob Walder takes a step-by-step look at the type of cable you need and how to get two computers talking to each other



Perl of wisdom

Nigel Whitfield walks through the basics of Perl, a hugely versatile programming language.

If you're a regular reader of the Hands On section of PCW, you'll have seen countless references in the Internet and Web Development sections to Perl. It's a programming language that has become almost a standard part of the Unix operating system and can also be found in versions for Windows, Macintosh and pretty much anything else you care to name.

Each mention of Perl in PCW is usually accompanied by many requests for more information - far more than can

be fitted within the constraints of a Hands On column. Hence this introduction, which will hopefully help you to start writing your own useful scripts.

Part of the appeal of Perl is that it's powerful and flexible - it's been called a Swiss Army chainsaw by some. One of the most useful aspects of the language, especially for web and database work, is the powerful string-handling facilities, which allow you to search for complicated patterns and replace them with something else, or to edit text quickly and easily.

■ Out of type

Those who are used to other programming languages might be confused - or even startled - by some aspects of Perl. You don't need to declare any variables, for instance. And if you need to use a counter as a number in one place, and a string elsewhere, you don't need to convert it. Treat it how you need to, when you want to, and Perl will convert it on-the-fly.

```
You can, for example, say:
$incvat = $price * 1.175 ;
print "The total price ✓"
```

A glossary of some basic Perl

This is not a comprehensive list of commands and structures, but should get you started. The Perl Reference Guide (free from the Internet) has a summary of language and core functions.

Variables

\$a
A string or numeric variable

@a
The whole array
(\$a[0], \$a[1] ...\$a[x]).

%a
An associative (indexed) array.

\$a{x}
An element of the associative array %a. For example \$members{'nigel'}.

@ARGV
An array containing the arguments given when the script was started.

\$_
The current line being read from a file, or in a loop.

Program flow

A block of commands can be grouped together within curly brackets, as in the examples here.

do { commands } ✓
until (condition)
while they can also be used at the end of the loop.

if (condition) ✓
{ commands }
if (condition) ✓
{ commands }
Else { alternative commands }

Use elsif to add another condition.

last
Finish executing a loop.

next
Go to the start of a loop.

while (<HANDLE>) ✓
{ commands }
Perform commands as long as there is data available from the file referenced by HANDLE. \$_ is set to each line in turn.

Useful functions

close HANDLE
Close the file referred to by HANDLE.

keys(%a)
Return an array of all keys for an associative array.

open(HANDLE, ✓
\$filename)
Open a file, which can be

referred to by HANDLE. Files are open for reading by default. Use "> \$filename" to write to a file, ">> \$filename" to append.

print
Display output. Use print FILEHANDLE 'something' to send data to an open file.

printf
Similar to print, but uses formatting similar to the C language printf function.

s/search/replace/
Substitute a regular expression for another in a string. Add a trailing i to make it case-insensitive, or g for global to change occurrences in a string.

sort(@array)
Return a sorted array, eg @name = sort(keys (\$members));

split(/pat/, ✓
\$variable, parts)
Return an array by splitting a string into two or more parts, eg (\$firstname, \$surname) = split(/,/,\$wholename);

values(%a)
Return all the values held in the array %a

Operators

=
Set a variable to a value, eg \$vatrate = 0.175.

==
Test if variable has a numeric value, eg if (\$counter == 0) Use != for not equal.

eq
Test to see if a variable has a string value, eg if (\$message eq 'hello') ... Use ne for not equal

&&
And. True if both left and right-hand expressions are true, eg if ((\$a == \$b) && (\$msg eq 'hello')). Or use as a short form of if.. then, such as (\$command eq 'quit') && exit ;

||
Or. Used same way as &&.

=~
String matching, used either to match a pattern, or in a substitution, eg if (\$a =~ /pcw/) or \$a =~ s/search/replace/ ; Use !~ for not matching.

.=
String concatenation, eg \$name .= \$lastname . ' ' . \$firstname ;

Beyond the web

While many use Perl as a web tool, it has a lot of other uses. Whenever you need to process text files, it can make life easier.

Some organisations use Perl to take the text files exported from a database and mark them up with codes for DTP programs. QuarkXPress and Ventura Publisher can read files with 'tags' which look like HTML, but with more options. By laying out a page in a program such as this, and saving it as a tagged text file, you can see what you need to add to your database output to allow the DTP program to set the attributes when you import it.

But how do you get your text there? One technique is to write your script so it reads all the files in a particular directory when it's run.

This example code will

look for files ending in .csv and process them in turn, leaving a file with the same name, but ending in .gen instead.

```
# loop over all
the csv files
foreach $in
( <*.csv> ) {

$out = $in ; $out
=~ s/\.CSV\/\.GEN/i
; printf
("Converting %s to
%s\n", $in, $out) ;

open( INPUT, $in )
|| die("Can't open
input file $in\n") ;
open( OUTPUT, ">
$out" ) ;

# now read the
lines from the
input file
while ( <INPUT> ) {

# put code here to
process the file,
```

```
# sending your
results to OUTPUT
using
# print OUTPUT
$results
}

close INPUT ;
close OUTPUT ;

# now do the next
file, if any
}

exit ;
```

And that's it. When the program's run, the <*.csv> in the foreach statement is expanded to the CSV files in the current directory. The i on the end of the substitution command is needed, since a Windows system will match .CSV and .csv - while the filenames look different, Windows doesn't really understand upper and lower case. So how do you turn the CSV file into

something useful? Take advantage of the fact an array in Perl can be written as ('value 1', 'value 2', 'value 3'), and use the eval command. As long as there are no special characters to cause problems, you can treat a line from a CSV file as Perl code, splitting it into individual fields, as in the following:

```
Assume the line of text is
called $text
The CSV file looked like
'field 1', 'field 2'
Start by prefixing single
quotes, and turning double
to single
$text =~
s/'/'/g ;
$text =~ s/'/'/g ;

( $field1,
$field2,
$field3 ) = eval(
"( " . $text . " )" ;
```

(Key: ✓ code string continues)

including VAT is \$incvat\n" ;
 (Key: ✓ code string continues)

There are a few other basic parts of Perl there - each command ends with a semicolon, variables start with a \$, and if you enclose a string in double quotes, instead of single ones, then it's interpreted to substitute variables and special characters - such as the \n, which is a new line.

Before we get ahead of ourselves though, first things first. Where do you get Perl? If you have a Unix or Linux system at your disposal, chances are that it is already installed. If you're using Windows or a Mac, you can download a free version. And best of all, the scripts that you write on one Perl platform will run on others, provided you've not used any platform-specific features. So you can test your program on Windows, and be sure that when you upload it to a Unix web server, you won't have any problems.

SolutionSoft's PerlBuilder will even simulate the actions of a web server,

allowing you to fill in dummy forms and check that your script processes them correctly.

The biggest difference that you are likely to see between platforms is simply the way you launch your scripts. On a Unix system, starting them with the line `#!/usr/bin/perl` will let you type the name of the script, and the system will find the path to the Perl interpreter from the first line.

On Windows you will need to set up the shell to recognise files with an extension (such as .pl) as Perl scripts to run when you double-click on them, or start them by typing `perl myscript` on the command line.

Scripts themselves are simple text files, so you can write them in just about any editor you like. And since Perl is interpreted, you don't need to do any compiling or linking. You just run the script when you've written it. Or, if you want to check that you haven't made any silly mistakes, such as forgetting to close

quotes, or missing semi-colons off the end of lines, type

```
perl -c myscript
```

to have your script's syntax checked without being run.

How long is a piece of string?

So, Perl can be written easily without any special tools, it's free, and it is cross-platform. But when would you want to use it?

The most common use for the language these days is almost certainly for writing scripts on web servers - so much so that some servers, such as Apache, have Perl built in, saving time and system resources.

But that's not all you can do. As the box above shows, if you have batches of files that you need to process, transforming them from one form to another, it's an excellent tool to use - and is far more flexible than using macros in a word processor, for example.

Two of the keys to making the most of Perl are related to its handling of text



Top Perl resources

■ Websites

[HTTP://perl.oreilly.com](http://perl.oreilly.com) has a comprehensive list of O'Reilly publications for Perl, and links to other online resources.

www.activestate.com

contains downloadable Perl for Win32 systems, plus a host of other tools.

www.macperl.com is a site that deals with Perl for the Macintosh.

www.perl.com is the official Perl home page, with links to downloadable code and lots more.

www.perl.org offers a ton of useful resources for Perl programmers everywhere.

■ Development systems

www.solutionsoft.com

includes a downloadable trial version of PerlBuilder – a programming editor and debugger for Perl under Windows, which will simulate web-form processing to help develop scripts.

■ Books – the two bibles

Learning Perl, Randal Schwartz, O'Reilly and

Associates, ISBN 1-56592-284-0
Programming Perl, Larry Wall & Randall Schwartz, O'Reilly and Associates, ISBN 1-56592-149-6

■ Perl in PCW

Hands On, Web Development, November 1999:

Processing CGI input.

Hands on, Internet, July 1999:

Using Perl to generate HTML pages from a database.

Hands On, Internet, June 1998:

Putting a database on the web with Perl.

for dealing with strings. But there are many other things you can do; Perl 5 provides loadable modules that make handling CGI easy, or special functions to call the Windows 32 API directly.

On Unix, you can make connections directly to TCP/IP, allowing you to write things such as servers in Perl, or you can embed it in other languages such as C. There's even a PerlScript plug-in for web browsers, so you can use it as a scripting language on your web pages.

While we have only just touched on some of what

strings – associative arrays, and a powerful system for matching and replacing text using 'regular expressions'.

A regular expression is quite simply a way of expressing patterns using certain special characters, of which Perl has plenty.

If you have used the advanced search-and-replace features of MS Word, then you will be familiar with the concept, using things such as ^p to represent a new paragraph.

Perl actually goes way beyond that, allowing very complex searches which can include multiple alternatives, automatically saving parts of the search string if you need them.

For example, if you want to look for a line that begins with either the word 'hello' or 'goodbye', regardless of case, you could use the expression:

```
if ( $text =~ /^(hello|goodbye) (.*)/i ) { ... }
```

When the pattern matches, anything in brackets is automatically used to set the values of temporary variables \$1, \$2 and so on. So if the text was 'hello mother' then, as well as knowing that you had found a matching line, \$1 would be 'hello' and \$2 would be set to 'mother', so that you can use a single expression, and take action based on the text that was matched very easily.

The number of options for regular expressions is astonishing – with a bit of work, you can match just about anything you need; the manual pages for Perl give

you all the details. Alongside regular expressions and the functions, such as substitution and searching that rely on them, associative arrays can be key to using Perl efficiently.

Put very simply, an associative array is

an array that is automatically indexed, but instead of using a number, it uses a string. Which ultimately means that it is like a database.

If, for example, you want to store membership information in an array, you don't need to search through numeric indices to find someone's entry.

All you need to do is use an associative array, with their name as the index, so that you can refer to \$memberinfo{'fred'} and access their information directly.

Using associative arrays can also be a boon when you're processing web forms, allowing you to use a simple piece of code for any form, thereby saving all the fields quickly and easily.

■ More to it than boy meets Perl

The key to using Perl is, in many cases, learning to master the tools it provides

makes Perl such a powerful tool here, there is a whole lot more that can be done with it.

If you are in any way familiar with other languages, you'll find that it is remarkably easy to start writing your first

The screenshot shows the Perl Mongers website. At the top, there's a logo with a camel and the text 'Perl mongers'. Below that, there's a navigation bar with 'Perl Mungers' and 'Perl Mungers - The Perl community people'. The main content area has several sections: 'For the press', 'For IT managers', 'Perl CD Bookshelf', and 'Perl CD Bookshelf/Agriem bookpads'. There's also a sidebar with 'Perl - ITS SUPPORTERS BELIEVE IT'S THE MOTHER OF ALL PROGRAMMING LANGUAGES'.

PERL – ITS SUPPORTERS BELIEVE IT'S THE MOTHER OF ALL PROGRAMMING LANGUAGES

scripts, even with the most basic of commands as listed in our glossary on the opening page.

If your appetite has been whetted, delve into the manual pages, look at the websites that we have listed – or you could even pick up a copy of *Learning Perl* (see box above).

After a while, you'll start to wonder how you ever managed without it.

PCW CONTACTS

Nigel Whitfield welcomes your feedback. Contact him via the PCW editorial office or email Internet@pcw.co.uk



Standard sayings

Nigel Whitfield berates Microsoft's communication problems, and throws down the gauntlet to BT.

If you're a programmer, or even just a regular user of the Internet, you'll probably understand the benefits of the following phrase: 'Be liberal in what you accept, and strict in what you send.' It's a saying that's often applied to standards – especially the Requests For Comments (RFCs) – which underpin much of the way that the Internet works.

In short, it means that when someone writes a program that's designed to work with the Internet, it's good practice to be a little forgiving of any minor flaws in information that your program receives. At the same time, you should adhere strictly to the standards, making it much more likely your software will work with all the other programs out there.

One of the joys of the Internet is that you can take, for example, any email program, and be safe in the knowledge that you can use it with any standard email server.

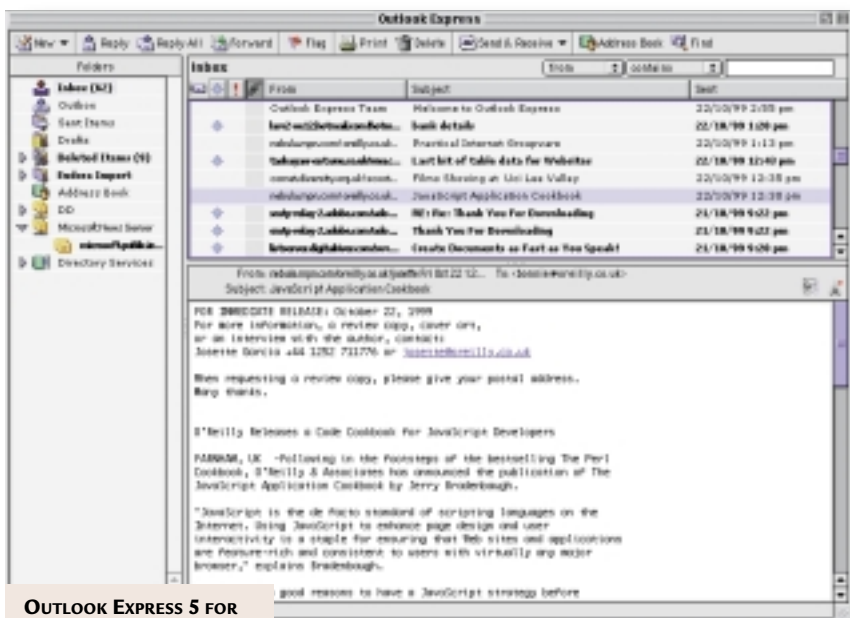
So it was with a light heart that I decided to download the Macintosh version of Outlook Express 5 (OE5) – especially since it has a 'Test Drive' feature that allows you to run it alongside your existing email program.

OE5 for Macintosh certainly looks like a high-quality program. It has a good-looking interface (although there are some minor irritations), and allows users to synchronise their contacts with a Palm Organiser. The news reading features aren't stunning, but it is primarily a mail program, after all.

And that's why it's surprising that it falls down so badly when it comes to being liberal in what it accepts.

A quick trawl through messages on the microsoft.public.internet.mail.mac newsgroup reveals that I'm not the only one to discover a problem. It seems that Microsoft has managed to produce an email program that is simply not

The problem lies in the way Outlook Express interprets message headers



OUTLOOK EXPRESS 5 FOR THE MACINTOSH LOOKS NICE – IT'S A SHAME IT DOESN'T UNDERSTAND SOME COMMON INTERNET MESSAGE FORMATS

compatible with one of the most widely-used formats for mailboxes on the Internet. A number of users have reported that when they reply to a message, the date is included at the end of the email address!

The problem lies in the way Outlook Express is interpreting message headers. If you've ever looked at the raw mail files on a Unix system, chances are you've noticed that there are two 'From' lines in each message. One – the first line of the

message – gives a return path and a date, and starts 'From:', while the other has the real

address for replies and starts 'From:' And Outlook Express for the Mac is completely unaware of this. So, while it may work well in some circumstances, if the mail server that you use returns messages in this two-line format, you're going to have to edit the address each time you hit the Reply button.

compatible with one of the most widely-used

Nice one, Microsoft. How about a bit more testing, eh? Doubtless this bug will be fixed in time for the program's full release – in the meantime I'm glad I opted for the test drive. At least I can get back on the main road with Eudora, which happily understands standard mail formats.

Timed to die
Could the clock finally be about to stop? As this column is being written, a completely free ISP with 0800 access is set to launch at www.callnet0800.com, AOL is rumoured to be looking at a way to avoid time-based charges for users of its service, and dark mutterings from BT suggest it is looking at ways of introducing a new tariff that might make it cheaper to stay online.

With the Government announcing an initiative that will allow people on low incomes to hire computers cheaply, some movement on call prices is long overdue. Otherwise there'll be houses full of low-cost computers that people can't afford to connect to the Internet.

Instead of increasing ADSL prices at the same time as lowering the speed, how about a little movement



Questions & answers

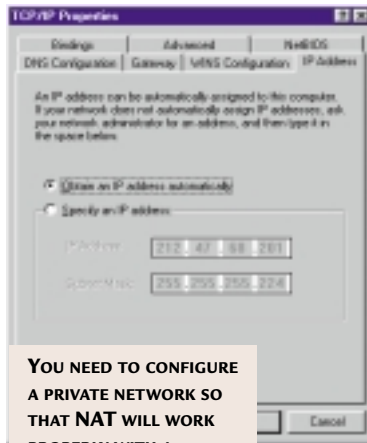
Q I am trying to install Internet access for a very small network (four users) and have a Netgear RM356 V.90 router acting as a server. Because Internet use is likely to be light I wish to use one of the free ISP providers.

I have tried Virgin.net, but although I can get the router to test the connection and it states the connection is fine, I cannot get Explorer to make the connection. If I use Outlook, the connection wizard asks for the POP3 and SMTP servers, and if I then put pop.virgin.net and smtp.virgin.net in these fields it doesn't make a connection.

If I put the DNS server address in these fields the router is activated, it dials the number, attempts to make a connection and then fails with a message regarding the POP3 address. Is it possible to make the connection this way or am I barking up the wrong tree?

a Yes, you can do this, but you'll need to put some effort into the configuration to make everything work.

Essentially, what happens when the router connects to an ISP is that its connection to the rest of the Internet is assigned an Internet address. It also receives information regarding routing and, in some cases, the DNS server to use – although you can specify this manually if you wish.



YOU NEED TO CONFIGURE A PRIVATE NETWORK SO THAT NAT WILL WORK PROPERLY WITH A ROUTER

As far as the network is concerned, you need to configure a private network, using addresses on one of the reserved number ranges, such as 192.168.1.x

Each of the machines on the network needs to be configured separately, which you can do either manually, or via the DHCP server that's built into the router. If you choose the DHCP option, you need to fix the address of the router (perhaps 192.168.1.1), and tell the other systems that it's the DHCP server.

When a connection is established, the router uses Network Address Translation (NAT) to 'hide' the private addresses from the ISP connection, and pass traffic between the different machines and the Internet.

The key is to ensure that everything is set up on the network side, either manually, or via DHCP. Without that, nothing else will work.

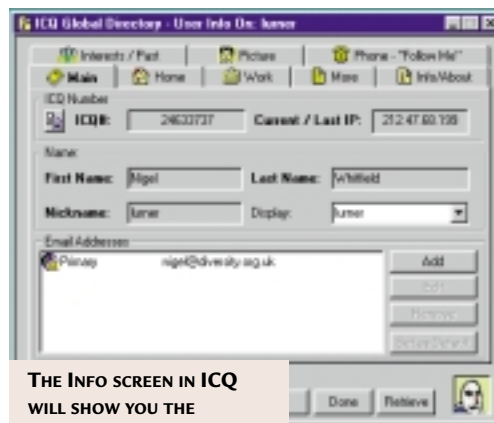
Remember also that although NAT allows you to hide a network of machines

behind a single-user account, you may be breaking the terms of service of some ISPs by doing this. Check the small print first.

Q A friend of mine uses ICQ and received a message from someone who says he has her IP number and can now 'get into' her machine and do all sorts of things – although of

course he says he's not going to. Is this right? What can she do about it?

a Yes, it's possible to find out someone's IP address when you talk to them on ICQ – simply pop up the info screen and you can see their current or last IP address. And, if you know someone's IP address – which can also be found out easily if you see them on IRC –



THE INFO SCREEN IN ICQ WILL SHOW YOU THE CURRENT OR LAST KNOWN IP ADDRESS OF ANOTHER USER

you can, in theory, attack their computer. That's why it's important to take some of the security steps I have mentioned

in previous columns (see November 1999). Windows users should also take a look at last month's issue, which contains a list of suggestions for tools that can help protect your system from attack.

Q I use Windows 95 original build with Internet Explorer 5 installed. I have a folder called c:\windows\java\ containing subfolders and some fairly large .zip archive files, which are taking up over 10MB of space. Assuming that the system cannot be using them in their current form, do you know what I am supposed to do with them, or what they are for? Can I delete them to save space?

a You can delete them if you also turn off Java. These are files that contain Java libraries in a compressed form. If you delete them, then

you won't be able to run Java apps, which are used on a lot of websites. I'd suggest turning off Java in the browser first,

and seeing if you suffer any problems with the websites you usually visit. If you don't, then you're probably OK to delete the files. Alternatively, treat yourself to a bigger hard drive.

from BT. While helping people may not be the firm's strongpoint, a commitment to a wired country would be a millennium present we could all welcome.

Alas, the time has come to say goodbye to this column. Internet issues will be covered in the Hands On Networks section from the next issue of PCW.

PCW CONTACTS

Although this is the last Internet column, you can contact Nigel Whitfield for the remainder of the month at the PCW editorial office or email internet@pcw.co.uk



Exploring the options

Tim Nott on the possibilities lurking in the background, animating Explorer and more.

Several readers wanted to know how I got the clouds background to the Explorer toolbars in the screenshot in November's issue. You don't, as Peter Geddes suggested, need a separate program to do this (but see later), and it's not as Mike Stewart suggested 'one of those settings buried deep within IE options'.

You can do this with a simple registry hack, so – making sure you have a recent back-up – go to HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Toolbar. The toolbar background is set from a string value entitled BackBitmap, whose value is the path to the image file, which needs to be in .bmp format. There are, it seems, no colour-depth or size rules to comply with.

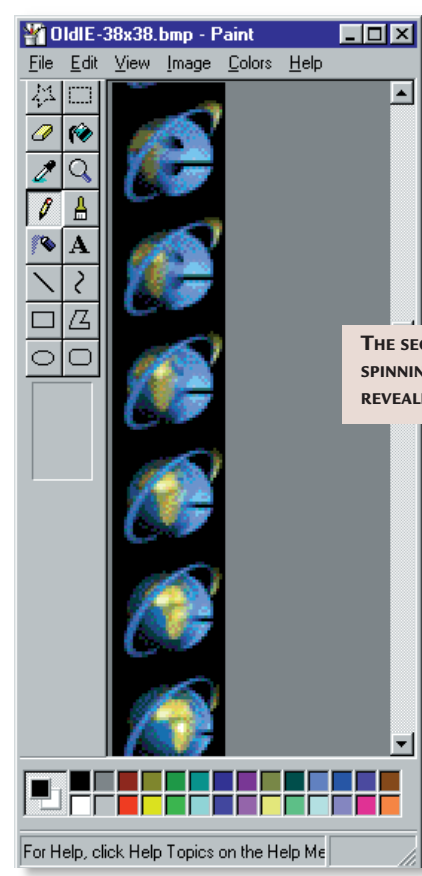
The size of the background will obviously vary with the toolbar arrangements and window size: the source image will be cropped and/or tiled to suit. Stick to pale, low contrast images if you want the menus and icons to remain legible.

Some readers may remember we did all this some years back in the Win95/IE3 days, but the settings have changed since then, and the shell enhancements in Windows 98/IE4 means that the background can be seen in Windows, as well as Internet Explorer.

Since we're here we may as well collect the set. The little logo at the top right of the window is slightly more complicated. For a start, the size changes according to the toolbar arrangement, whether large or small icons are used and whether icon labels are displayed. Hence two versions of the bitmap file are required.

The path to the smaller is given by a string value entitled SmBrandBitmap and the path to the larger by BrandBitmap – both these values being in the same location as BackBitmap. The larger bitmap should be 38 pixels square, the smaller 22 pixels square – again there's no colour-depth restriction, but the file must be in .bmp format.

If you want to animate these, such as the default IES spinning



THE SECRET OF THE SPINNING E-GLOBE REVEALED

e-globe, then there's no great mystery.

Using the bitmap editor of your choice, create an empty 'film strip' which is the width of the static icon and the height n-times the width, where n is the number of frames you want in the animation – the default e-globe uses 46 frames. Then paint or paste each square frame (there's no gap between them) into the film, starting from the top. The first four frames are a lead-in – when the last frame is reached in the animation, it starts over at frame five.

One rather more useful option is to change the

FAR TOO EASY – GET IEP TO DO THE HARD WORK FOR YOU

destination of the IE5 search button. This URL is held in HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\SearchURL, under the Default string value.

If all this seems like too much effort, then there's a ready-rolled solution available. The Internet Explorer Personaliser, available from <http://accesscodes.hypemart.net/>

allows effortless editing of all the values mentioned above. It has an option to return to the default settings, should

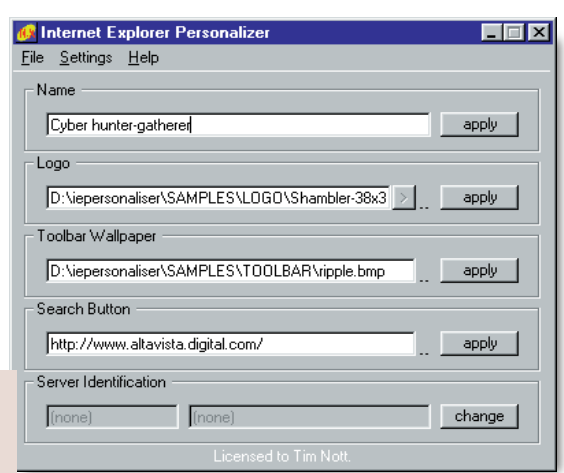
you really mess things up. As an extra bonus, it comes with tools to create and view animated logos and a range of sample logos and toolbar backgrounds.

■ **Outlook Expression**

On a related matter, following last September's tip on how to change the wording on the Internet Explorer title bar, Rob Pattison and several other readers asked how to perform a similar customisation – or decustomisation – of the Outlook Express title bar.

To recap, the IES custom title is held at HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Internet Explorer\Main under the value Window Title. Note that unlike the options mentioned above, this is a machine-wide, rather than user-based setting.

Outlook Express 5, just for the sake of inconsistency, keeps its title back in the

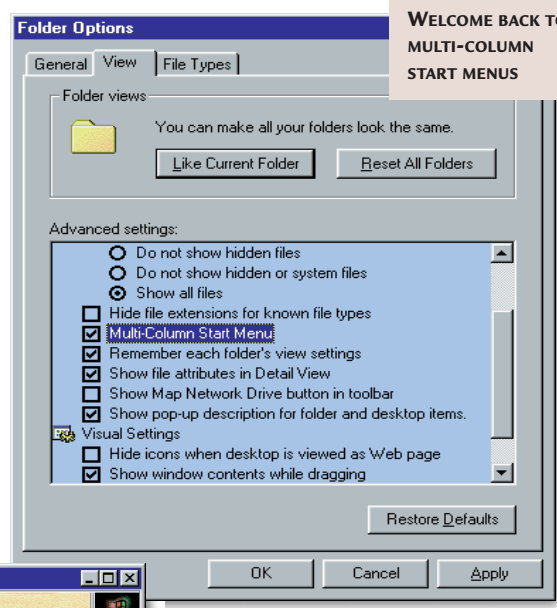




hands on windows

user part of the registry, at HKEY_CURRENT_USER\Identities\{1CD802C0-E872-11D2-8E28-E67DC522AA0E}\Software\Microsoft\Outlook Express\5.0, under the value WindowTitle (without a space).

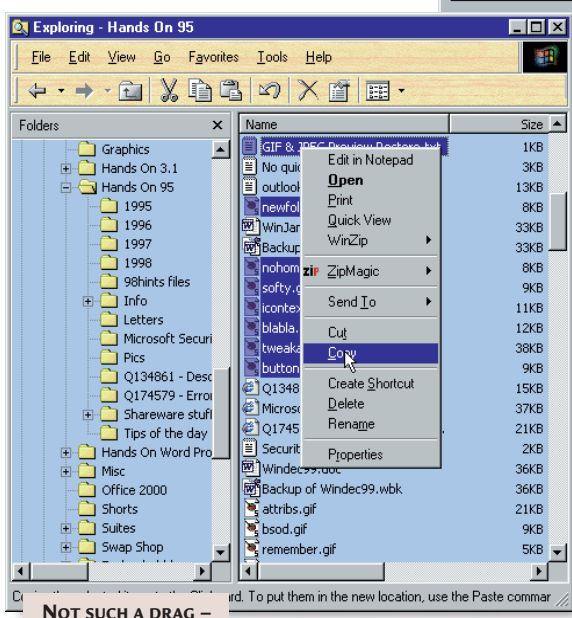
Once again, if you'd rather get the servants to do this, then download the Outlook Express 5 Tweaker from the same address as the IE Personaliser. Like the latter, it's free, and it comes ready to customise OE5 in various other ways, too, such as removing the 'splash' screen and the Hotmail sign-up. Personally, I find the Outlook Express splash screen essential, as it helps stop that 'I'm sure I just clicked on the Outlook Express icon so why is nothing happening?' feeling.



WELCOME BACK TO MULTI-COLUMN START MENU

Next, right-click. Then if you want to copy the files, select Copy and if you want to move them, choose Cut. Now you can take a leisurely scroll to the destination folder, right-click, then Paste.

Note that if you've chosen Cut, the files don't actually get removed from the source folder until you paste. And even then you have the further fallback of right-click, Undo. Finally, if you've copied, rather than cut the files, you have the further option to paste a shortcut.



NOT SUCH A DRAG - THE EASY WAY TO COPY OR MOVE FILES

On a more serious note, if you're planning a mass roll-out of Internet Explorer, Microsoft offers specific tools to help with this. These cover both in-house corporate installations and third-parties (eg ISPs) creating customised IE and OE installations.

At the time of writing the Internet Explorer 5 Administration Kit and the Internet Explorer 5 Corporate Deployment Guide could be downloaded from the business section of the Microsoft Internet Explorer website at www.microsoft.com/windows/ie.

Tips

Right - that's quite enough on OE and IE. One bad point about Windows 95 and 98 is that copying or moving files

between folders is fiddly. To drag and drop, you need to open two folders, then move and resize them so that they don't overlap.

In Explorer, it is possible (if you are careful) to drag a file out of the right-hand pane, then scroll up the left-hand pane to drop it on the destination folder. Provided, of course, that the desired branch is already expanded and you don't drop the file on the way (hint - if you

misdrops don't bother to go looking for the file - right-click back in the source pane and Undo).

There is, however, a better way. Select the files you want to copy or move - remember Control & click adds (or removes) individual files from a selection, and Shift & click adds a continuous range of files.

Menu à la carte

One favourite moan about Windows 98 is the way the start menu and/or its sub-menus no longer break into columns when too high for the screen - instead there are fiddly scroll buttons at the top and bottom. Hitherto, my advice has been either to organise the start menu folder and sub-folders to break the menus up into more manageable lengths, or to learn to live with it. At least it's not as bad as the old Windows 3.x Program Manager, where all your icons would turn into black squares if you had too many in the same group.

A recent monitor breakdown forced me to rethink this. Because the spare monitor was limited to a resolution of 800 x 600; and I had a lot of review software installed, and I was too lazy to take my own advice about reorganising,

(FIG 1)

The multi-column menu registry file

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\explorer\Advanced\Folder\StartMenuScrollPrograms]
"Type"="checkbox"
"Text"="Multi-Column Start Menu"
"HKeyRoot"=dword:80000001
"RegPath"="Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced"
"ValueName"="StartMenuScrollPrograms"
"CheckedValue"="false"
"UncheckedValue"="true"
"DefaultValue"="true"
"HelpID"="update.hlp"
Ends
```

(Key: ✓ code string continues)

Questions & answers

Q I can never get DEFRAG to work properly in Windows 98, because a program I can't find is continually writing to the drive, forcing DEFRAG to start again from the beginning. It occurred to me you could just use the DEFRAG command in DOS and bypass this problem, but I haven't tried it, what do you think?

STEVE MARSHALL

a Nice idea, but the there's no such thing as a DOS defrag with Windows 95 or 98.

A better strategy is to try

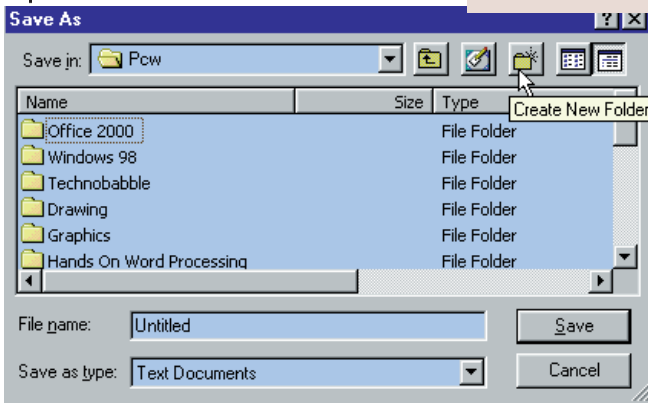
that is the Windows interface.

Q Every time I right-click on a directory to get the pop-up menu, I expect to see an option allowing me to create a subdirectory there and then, instead of having to go back to File, New, Folder. Is there a utility out there to let me do this or am I going to have to try to write one myself?

STU PHILLIPS

a You need to right-click in, rather than on the folder – that is either in the right-hand pane of Explorer, or in a Folder window, with nothing

CREATING NEW FOLDERS ON-THE-FLY IS EASIER THAN THE FILE, NEW, FOLDER ROUTE



pressing Control, Alt & Del together to find out what is running. You can then select the 'hidden' programs and close them one by one. Don't close Explorer, however, as

selected. Note that you can also create new folders on-the-fly when saving files. Click on the folder-with-a-star button in the Save As... dialog.

Q When entering the phone number to be used by DUN how do you insert a pause? I've tried * and #, but neither seems to work.

CRAIG SHANKLIN

a A comma is what you need.

Q I have noticed that in some programs and on some web pages, one of my fonts looks a bit weird.

This is obvious in Internet Explorer when a web page cannot be displayed. I get the message web page unavailable offline and the font used to display that message looks rather rough at the edges. Could you tell me which font is bust or even if it is the fonts and how I could repair it?

MICHAEL ARM

a The font used to display this message is Verdana. Close all applications, open the fonts folder, and make sure 'Hide Variations' is not checked in the view menu. Delete all versions of Verdana, if present. In Windows 98 (original version) you can replace these from WIN98_47.CAB in the Win98 folder on the CD-ROM. If you have another version of Windows, then the files may be elsewhere on the CD. If you have the original version of Windows 95, then give up

now, because it isn't there. You can find files in CABs using the MS-DOS EXTRACT command – type EXTRACT /? for full instructions.

If that fails, then you can find the fonts at the Microsoft website – www.microsoft.com/typography.

Q My Windows 98 registry has become huge! System.dat is over 5MB, so I thought I would remove some applications I never use.

Sure enough, the relevant entries had been removed when viewed in Regedit, but the file sizes have stayed exactly the same as they were. How can I reclaim this wasted space?

KIERAN DOYLE

a According to the Windows 98 resource kit, the registry checker, which runs automatically when Windows starts or on demand, has an option, set in SCANREG.INI, to optimise the registry when it is run. This doesn't seem to make much difference, though.

For a more thorough job, restart in MS-DOS mode and run the command-line version, as follows:

SCANREG /OPT /FIX

This will take a few minutes, but will completely reconstruct the registry. As with all registry actions, make sure you have a recent back-up first.

this scrolling menu rapidly started to annoy me.

So off I went, surfing the Internet in search of a cure. And I found one. Type the text shown in Fig 1 into Notepad. Save it as MENU.REG. Check you have a recent good registry backup first, then double-click on MENU.REG to merge it into the registry. And lo! You should then have the option shown in the screenshot, under Explorer, View, Folder Options, View. Selecting this option will recall the multi-column menu display that we thought had gone forever.

■ Size doesn't matter

Stuart Taylor sent in a short and sweet tip, which I'd never realised. Alt & double-click on an icon takes you straight to its properties.

■ IP hunt

I'm not an online gamer myself, so I haven't had this problem, but here's a useful tip from Phill Sacre. You might want to find out your IP address – for many providers this is assigned by the server, rather than being specified in the DUN settings.

There is a program in the Windows folder called WINIPCFG.EXE. Run this and, if you're connected to the Internet or a network, it will show your IP address. Phill adds that this works in Windows 98 and later versions of 95.

PCW CONTACTS

Tim Nott welcomes your feedback on the Windows column, but cannot deal with queries concerning the PCW CD-ROM or website. Contact him via the PCW editorial office, or email win@pcw.co.uk



Going live

Tim Anderson shows how to display live data using ASP and Windows web server

The killer feature of Microsoft's Active Server Page technology is the ability to take advantage of COM objects on the web server, including Advanced Data Objects (ADO), the high-level database API for accessing data programmatically on Windows. This month I explain how to create a website that lets you query a database and view the results. It uses an Access database because it is the most convenient to try out the technology, but on busy websites you should consider at least SQL Server as an alternative.

I have chosen to show a solution using just plain text typed into Notepad, rather

(FIG 1) The search form

```
<html>
<title>Music search</title>
<body>
<h3>Search by artist</h3>
<form method="post"
action="artistsearch.asp">
<p><b>Name:</b></p>
<input type="text" name
="artistname" size=50><p>
<input type=Submit>
</form>
</body>
</html>
```

(Key: ✓ code string continues)

than delving into the intricacies of Visual InterDev, Microsoft's ASP development tool. Beginning with the direct route gives you a better understanding of how it works. Another factor is that text editing is free, whereas Visual Studio costs money. If you have not tried this before, you may be surprised how little code is needed. ASP is a great solution for publishing data, even on a small local network. You get good performance even from a dial-in connection; Mac and Linux boxes can easily read the data; and no client installations are needed. You do need at least Personal Web Server 4.0, or better still Internet Information Server 4.0 running on Windows NT.

This particular site is for searching a

(FIG 2) ARTISTSEARCH.ASP

```
<html><body>
<h3>Here are the results of your
search:</h3>
<% on error resume next
sArtistName=request.form("artistname")
if sArtistName = "" then
Response.write "<p>You must enter an
artist name</p>"
Response.write "</body></html>"
Response.end
end if
set conn = Server.CreateObject(
("ADODB.Connection")
conn.open "Provider=Microsoft.
Jet.OLEDB.4.0;Data
Source=C:\MyData\CDlist.mdb;Persist
Security Info=False"
sSql="SELECT
titles.title,titles.id,
titles.medium,titles.date,artists.name
from titles,artists WHERE
artistid = artists.id "
sSql=sSql + "AND artists.name LIKE '" +
sArtistName + "%' "
sSql = sSql + "ORDER BY artists.name,
titles.title"
set rs=conn.Execute(sSql)
rs.Movefirst %>
<table border=1 cols=4>
<tr>
<th> Title </th> <th> Date </th> <th>
Format </th> <th> Artist </th>
<% do while not rs.eof %>
<tr>
<% response.write "<td><a href=" +
chr(34) + "showtracks.asp"
response.write "?titleID="
response.write cstr(rs.fields("ID")) +
chr(34) + ">"
response.write rtrim(rs.fields(
"Title")) + "</a>"
%>
</td><td>
<% response.write rs.fields("date") %>
</td><td>
<% response.write rs.fields("Medium") %>
</td><td>
<% response.write rs.fields("Name") %>
</td></tr>
<% rs.MoveNext
loop %>
</table>
<% rs.close
conn.close
if err.number <> 0 then
response.write "<p>Error! " +
Err.description + "</p>"
end if %>
<p><a href="musicsearch.asp">Click
here to search again </a></p>
</body></html>
```

CD collection, although it could easily be adapted for customers and their orders, books and authors, or any number of other scenarios. The database has three tables: Titles, Artists and Tracks. The idea is that users can search for all the titles by a particular artist, and then drill down to the track listing of individual CDs.

The site begins with a simple form (Fig 1), which calls an ASP page. A server-side VBScript in this second page does the real work (Fig 2). It begins by checking that a search string was entered, and exits with a message if it is an empty string. Note the Response.End method, which stops processing the page. All the code within '<%>' delimiters is script that runs on the server, while the other code is ordinary HTML.

The next step is to set up a data connection. The code here assumes the presence of the Microsoft Data Access Components (MDAC) 2.x, which supplies a number of goodies including the JET 4.0 native OLEDB driver. Creating a connection object with Server.CreateObject ('ADODB.Connection') is easy, but the parameters for the connection's Open method are a little obscure. The easy way round this is to use a Universal Data Link (UDL) file to generate the correct code. Right-click the desktop, choose New - Microsoft Data Link, and double-click the new file to open its property

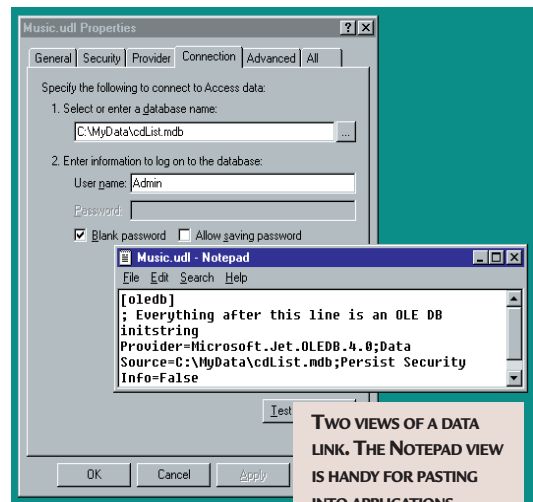
sheet. On the Provider tab, choose Microsoft Jet 4.0. Click Next, browse to the MDB file you want to use, and finally click Test Connection to try out the link.

Once armed with a working UDL, there are two ways you can use this in an ASP. You can connect using the file itself, by using the File Name parameter of the Connection's Open method. Alternatively, you can open the UDL in notepad and copy the parameters from there. Either way, it saves you working out what parameters particular OLEDB providers expect.

After making a connection, the ASP code has to build an SQL query matching the search string entered by the user. This process will be familiar to anyone who has worked with VB data access. For more complex queries, Microsoft Access can be handy since its query builder has a two-way View SQL feature, so that you can copy and paste working SQL code. Our

example uses a wild card. A single letter of the alphabet retrieves all the artists whose names begin with that letter, while longer strings narrow the search. Finally, a Recordset object is created using the Connection.Execute method.

The remainder of the code iterates through the recordset to generate an HTML table. The neat trick here is that the code generates a hyperlink for each title. This will provide a hot link to another page displaying the tracks for that title. The code generates HTML links, which means that although the user only sees the friendly title, a key value for that title is also stored in the HTML table. When the user clicks this link, the key value gets passed to another ASP that has the job of displaying



TWO VIEWS OF A DATA LINK. THE NOTEPAD VIEW IS HANDY FOR PASTING INTO APPLICATIONS

the tracks and perhaps other detailed information about the selected title. To generate this link, it is necessary to embed double quotation characters in the string returned to the browser. This and other awkward characters can be produced using VB's Chr function. Finally, the script closes the Recordset and the connection.

With a little effort you could generate a better-looking HTML page than the one shown here, exploiting the power of Cascading Style Sheets and using images as well as text. This code is stripped down so that you can see how it works. The concept of using an ASP to generate links to other ASPs is powerful, since it gives users access to detailed information while keeping each individual page small and manageable.

The showtracks.asp (see Fig 3) is similar. It illustrates another technique, using the phrase:

```
if rs.bof and rs.eof then
to check for an empty recordset.
```

■ Error handling

One ugly aspect of ASP is error handling. There is no nice exception handling, not even On Error Goto. Instead, the usual ploy is to stick On Error Resume Next at the top of your code, and inspect the built-in Err object when you need to detect errors.

PCW CONTACTS

Tim Anderson welcomes your web development queries and tips, via the usual PCW address or at webdev@pcw.co.uk. Get Microsoft's data access components from www.microsoft.com/data/mdac2.htm. You can find the example application online at www.onlyconnect.co.uk/pcw/asp.html.

(FIG 3)

SHOWTRACKS.ASP

```
<html><body>
<h3>Here are the tracks:</h3>
<% on error resume next
set conn = Server.CreateObject("ADODB.Connection")
conn.open "Provider=Microsoft.Jet.OLEDB.4.0;Data Source=C:\MyData\cdList.mdb;Persist Security Info=False"
sTitleID=Request.QueryString("titleid")
sSql="Select * from titles,artists where titles.artistid = \
artists.id "
sSql=sSql + "AND titles.id = " + sTitleID
set rs=conn.Execute(sSql)
response.write "<p><b>" + rs.fields("title") + "</b></p>"
response.write "<p><i>" + "by: " + rs.fields("name") + "</i></p>"
rs.close
sSql="Select * from titles,tracks where titles.id = \
tracks.titleid "
sSql=sSql + "AND tracks.titleid = " + sTitleID
set rs=conn.Execute(sSql)
if rs.bof and rs.eof then
response.write "<p>No tracks available</p>"
else
rs.Movefirst
%>
<table border=1 cols=1>
<% do while not rs.eof %>
<tr><td align=left>
<% response.write rs.fields("Track") %>
</td></tr>
<% rs.MoveNext
loop %>
</table>
<% end if
rs.close
conn.close
if err.number <> 0 then
response.write "<p>Error! " + Err.description + "</p>"
end if
%>
</body></html>
```



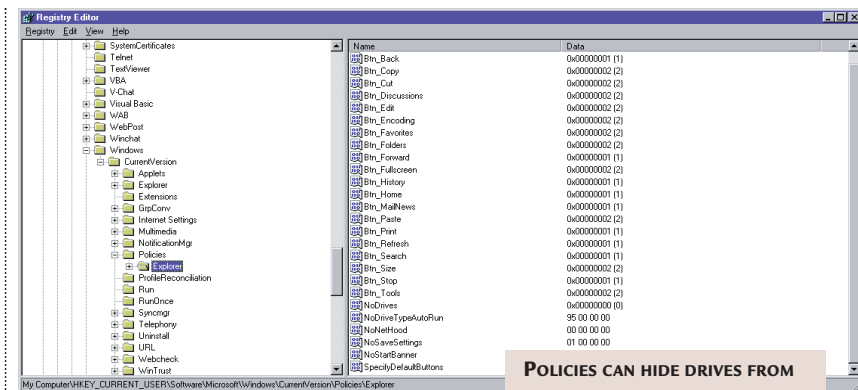
Emergency room

Andrew Ward dishes out repair kits on floppies, and advice on disappearing drives and passwords.

Here's a suggestion from Keith Sullivan, for those who are having trouble with the size of the normal floppy being inadequate for creating emergency repair disks (ERD). Before you start looking at alternatives, however, make sure the registry – which is what gets backed up onto the ERD – is as small as possible. Clearly, you can't just go around deleting software and removing the hardware that you need, but much of the registry will quite often be filled with rubbish that is left over from applications that have long since been deleted.

The problem is how to clean up the registry. The Microsoft tool RegClean was withdrawn with the advent of Service Pack 3 for Windows NT4, made a brief reappearance and then was withdrawn again because of problems.

Currently, you can still download RegClean 4.1a from the Microsoft website, but I wouldn't trust it. I use a



POLICIES CAN HIDE DRIVES FROM USERS, EVEN WHEN THEY ARE IN THE EXPLORER VIEW

little program that I mentioned back in March 1998, RegZap. We even put it on the cover disc for that issue, but you could try searching for it on the Internet.

What Keith Sullivan does to gain a bit more space on a standard floppy disk is use WinImage 5.0. This is designed to copy entire floppy-disk images, thereby allowing you to readily create install disks for an application you've developed, for example. However, it also allows you to format floppies in a number of different non-standard formats that accommodate more than the standard 1.44MB (and in case you've ever wondered why you can't fit 1.44MB on a

standard floppy, it's because the capacity is really only just under 1.41MB).

A total of four different formats are offered by WinImage, storing 1.63MB, 1.64MB, 1.68MB and 1.72MB. These sizes aren't much larger than the standard size, but in many cases they will offer just enough to allow you to get away with using a floppy for a bit longer.

Keith has successfully tried all four formats, although he recommends that the first two – which are Microsoft DMF formats – are more reliable, and my own experiments confirm this. And you certainly need an ERD to be reliable.

WinImage is shareware, and available from www.winimage.com. If you want to keep it, registration costs \$30 and can be performed online.

■ Vanishing drives

Kevin Stuttard reports a problem that drives don't vanish when they should. In last year's September column I mentioned the following registry setting, which is supposed to hide drives from Explorer:

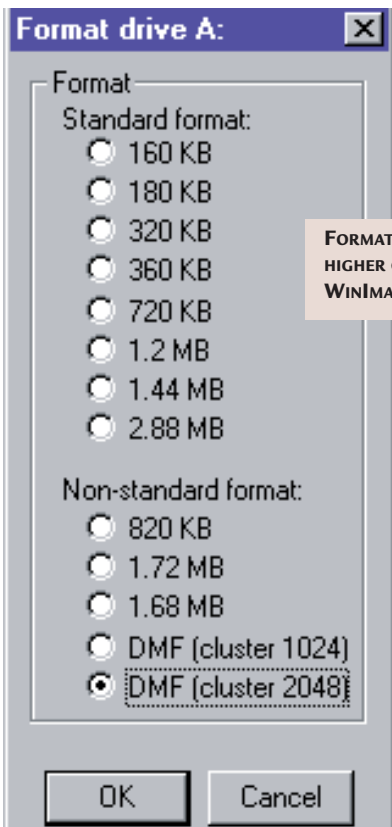
```
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer\NoDrives
```

(Key: ✓ code string continues)

This is a binary value with one bit for each drive, so hiding drive C should be accomplished by setting the value to four. However, Kevin quite rightly points out that this doesn't work very well because while the drive is hidden from the My Computer window it still appears as normal in the Explorer view.

You can't fit 1.44MB on a floppy, because the capacity is really just under 1.41MB

This was actually a bug in Windows NT, so depending which service pack and hot fixes you have, you may not suffer from it. Nevertheless, I should warn you that NoDrives isn't particularly secure anyway, unless you put a lot of effort into



FORMAT FLOPPIES TO HIGHER CAPACITIES WITH WINIMAGE

Quick guide to using Explorer Policies

NoClose removes Shut Down from the Start menu

NoLogoff removes Log Off from the Start Menu

NoFind removes the Find command from Start menu

NoRun removes the Run command from Start menu

NoFavoritesMenu, **NoDesktopUpdate** and **NoRecentDocsMenu** are self-explanatory

NoStartMenuSubFolder hides folders in the top section of the Start menu

NoSetTaskbar removes the Taskbar from the Settings menu

NoFolderOptions removes the Folder Options menu item from the Settings menu

NoSetActiveDesktop removes Active Desktop from the Settings menu

NoCommonGroups removes common program groups from the Start/Programs menu

NoDesktop hides all items on desktop

NoDrives hides drives in My Computer (and sometimes Explorer)

NoNetHood hides the Network Neighbourhood

NoSaveSettings doesn't save settings at exit

NoSetFolders hides the Control Panel and Printers commands and icons

NoStartBanner hides the arrow and Click Here To Begin caption that appear when you start

Windows NT

NoDriveTypeAutoRun disables AutoRun

NoTrayContextMenu hides the context-sensitive menus on the taskbar

NoViewContextMenu hides the context-sensitive menus on the desktop and in Explorer

EnforceShellExtension-Security only allows approved shell extensions

NoFileMenu hides the File menu in Windows NT Explorer

NoNetConnect-Disconnect hides the Map Network Drive and Disconnect Network Drive commands

RestrictRun I have covered in a previous column

locking down other aspects of the desktop. And even if NoDrives worked as advertised, users would still be able to access drive C if they could run the File Manager (WINFILE.EXE) or get at a command prompt.

With Service Pack 5, this bug was supposed to have been fixed. Unfortunately, a new problem was introduced. If your desktop included links to folders on local drives that have been disabled by NoDrives – which you might want to do to provide limited access to local data – these links no longer worked after upgrading to Service

Pack 5. What will happen with Service Pack 6 remains to be seen. Incidentally, you can set the NoDrives registry entry using the My Computer tab of the TweakUI control panel.

The box above shows many of the other policies that can be specified in the registry or via the System Policy Editor. Note that some of these require the Active Desktop option to work.

■ Now you see it...

John Howells writes in to say that as soon as he installs Windows NT on any system, he immediately uses the Disk

Administrator to change the CD-ROM to drive R – so any subsequent fiddling with the disk drives doesn't affect the CD-ROM drive letter. An excellent idea, and as John points out, you have to do this before you install any application software since applications have a habit of remembering – via a registry entry – the CD-ROM drive letter from which they were installed.

John also kindly explains that you certainly can see the CD-ROM drive in the default Disk Administrator view, contrary to what I claimed in the December issue.

However, what Disk Administrator also does is to remember its window size from one session to the other. This is fine for the horizontal view, since Disk Administrator scales the image to fit the window size. However, it doesn't do this on the vertical axis.

Hence, if you subsequently add a drive or drives to your system, then next time you run Disk Administrator it could be that the CD-ROM drive has disappeared from view by running off the bottom of the window. Unless you either resize the window or use the vertical scroll bar that should have appeared, you won't see the CD-ROM drive.

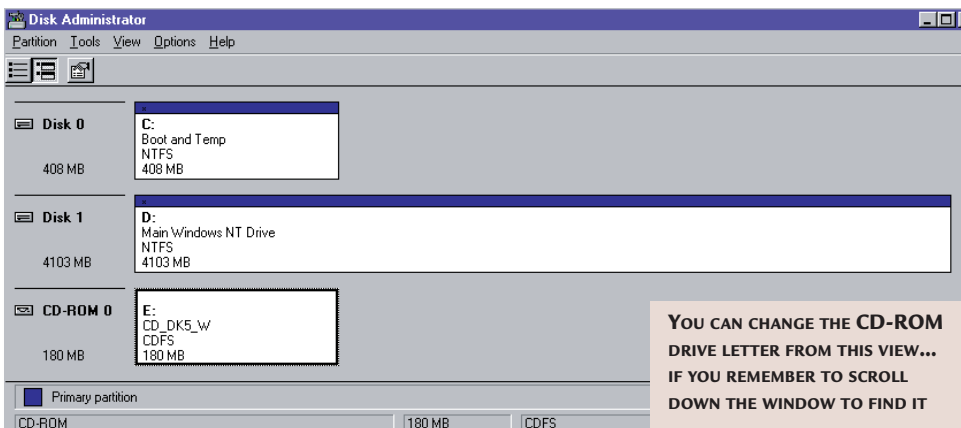
■ Forgotten passwords

A common complaint from readers is that they are confronted with having to deal with a Windows NT system where someone has forgotten the password to the administrator account. Sometimes these are systems that have been running quite happily for users and it's only when some reconfiguration is required that people realise no-one knows the administrator password.

Your first tactic should be to try the obvious words – admin is the universal

default, and sometimes administrator in full, or even just the word password itself. But failing that, there are plenty of things you can do.

One utility that's been written especially to help with this situation is ResetPassword, available from www.winsrc.freeserve.co.uk (see the web page for the usage conditions). This works on the basis of replacing spoolss.exe with a utility to





hands on windows nt

change the administrator password to admin12345. Unfortunately, this has never worked for me in practice, since systems that I have tried it on either don't allow non-administrator write access to the \winnt\system32 directory where spoolss.exe is stored, or I've run into the problem that spoolss.exe is already in use and can't be renamed. There is a foolproof way around this for FAT partitions, which is to boot with DOS and carry out the replacement. For NTFS partitions, you have a bit more of a problem.

The first way to solve it is free, but requires quite a bit of hard-disk space. What you do is install a second copy of NT on the system, boot into that, and make the changes from there. It's actually not as horrendous as it sounds. Installing NT is mainly a hands-off process – you spend most of the time waiting for it to copy stuff around. And it clearly isn't necessary to get anything complicated working, such as the network, the right video settings or the sound card – you only need access to the disk. In theory, you needn't even apply the latest service pack. A basic NT installation doesn't take very long. Another way to copy ResetPassword.exe to spoolss.exe on NTFS

partitions is to use NTFS-DOS. This is a version of DOS that

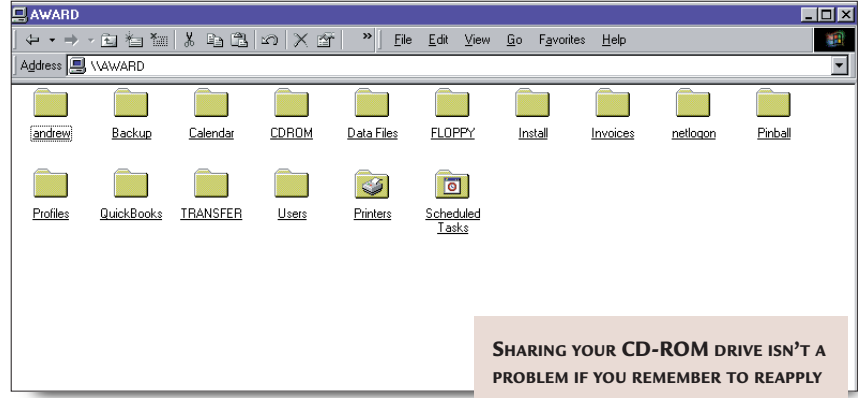
includes NTFS drivers, so you effectively have a boot floppy that enables you to read and write NTFS volumes. The latest version is NTFS-DOS Professional, which is available at www.sysinternals.com.

This actually takes the files ntfs.sys and ntoskrnl.exe from an existing Windows NT installation and uses these to access the file system within a DOS environment – guaranteeing full compatibility, regardless of which version and service pack you are using.

The drawback to NTFS-DOS is that you need to provide a copy of MS-DOS. The best DOS to use is MS-DOS 7, the one that comes with Windows 95/98, because this is the one that has support for long filenames.

Otherwise, you're restricted to using names in 8.3 DOS format. You'll also need a Windows NT licence in order to provide the ntfs.sys and ntoskrnl.exe files. So don't expect a ready-to-go solution,

The result of this omission by Microsoft is considerable amounts of system downtime



SHARING YOUR CD-ROM DRIVE ISN'T A PROBLEM IF YOU REMEMBER TO REAPPLY THE LATEST SERVICE PACK

and it's not much use if NT is your only operating system.

There are many other techniques and utilities designed to overcome the lost password problem, because it is so common. By and large, the other techniques are much more complex and long-winded than the ResetPassword method, even if you have to install a second copy of NT. Take a look at www.busprod.com/taggarjm/Computer/if_you_have_lost_the_administrat.htm for a very convoluted method.

NTRecover, Remote Recover and Locksmith – all available at www.sysinternals.com – will also work, but require fairly fiddly and extensive

setup procedures. In particular, you will have to make boot floppies and

you may have to find drivers for your network card if they're not on the supported list. NTRecover and Remote Recover have much wider uses than just retrieving forgotten passwords, however.

■ **Server storage**

Martin Goose wrote in about an all too common problem. He is attempting to share his CD-ROM drive around the network, but can't get it to work. In fact, he's suffered this problem for months. Remote Windows 95 systems that attempt to access the shared drive receive the message 'Access to the specified device, path, or file is denied.'

This puzzled me somewhat, because I frequently share CD-ROM drives – it's a very useful facility. The clue comes in the next error message – if he looks in the network neighbourhood on the NT machine itself, he sees '\\\machinename\CD-ROM is not

available. Not enough server storage is available to process this command'.

Those magic words 'not enough server storage' are the key to the problem. In general, if you ever get this message – whether at boot time, or during any network-related activity, or indeed at any other time – it's almost certainly due to the same cause.

Someone, at some time, has made a modification to the system – and in particular the networking configuration – that required some files to be copied from the original Windows NT CD-ROM, and they haven't subsequently re-applied the latest service pack. I'm betting that's the cause of the problem in this case (and I'm sure Martin will let me know if it doesn't do the trick!).

I find it extraordinary that Microsoft programmers haven't written something that pops up a dialog box which says 'Now please re-apply the latest service pack, which in this case is Service Pack 3, or your system will be unstable.'

The result of this omission is considerable amounts of system downtime, since this problem quite often means the network won't start at all, and people can spend hours or even days trying to identify the problem. But since Microsoft hasn't provided us with this reminder, it's our task to find some other way to remember. The best way to remind yourself is to stick a note on the case of your original Windows NT CD-ROM and write on it 'REMEMBER LATEST SERVICE PACK'.

PCW CONTACTS

Andrew Ward welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email nt@pcw.co.uk



A space of your own

Mark Whitehorn has **seen the PDA future**, and it's wireless with a tremendous storage capacity.

In the November issue I wrote about the Xircom network card and the Adaptec SCSI card and how they extend the ways in which a PDA can be used. The cards offered different solutions to essentially the same PDA problems of where you put your data and how you move it from the handheld to other hardware.

But things have moved on dramatically in a mere three months. Two fascinating advancements in technology have appeared, in an odd parallel to the Adaptec and Xircom solutions. One is a storage device and the other is a new type of networking technology.

■ Storage

The IBM microdrive is a miniature disk drive (think book of matches) with a 170 or 340MB capacity. It slots happily into any device that has a CF+ Type II slot with an ejector/release mechanism.

This Type II slot is, at 5mm, deeper than the CF+ Type I slot, though it uses the same style of connector (see *PCW* review January, page 90).

To my intense delight, the Psion 7 -



A HUGE (1,600 x 1,200) IMAGE OF THE BRANDENBERG GATE IN BERLIN. TAKEN WITH THE CANON PRO 70 AND STORED DIRECTLY ON THE MICRODRIVE. TO GET THE IMAGE TO YOU ALL I HAD TO DO WAS TO REMOVE THE CARD FROM THE CANON, PUT IT IN A PCMCIA SLOT IN A PC (USING THE CADDY PROVIDED) AND ATTACH THE JPEG TO AN EMAIL DESTINED FOR PCW

which is still in the prototype phase of production as I write - has a Type II slot, and so will be able to make use of this device.

The microdrive makes a world of difference to how PDAs can be used. I've been forced into lugging my IBM Jornada whenever I go away because, despite the fact that the HP Jornada 820 has a good screen and keyboard, I've never been able to back up my work.

The SCSI card and zip drive are great, but not for travelling because, when the obligatory power supply is taken into account, the whole lot comes to about the same weight as the laptop.

With the addition of a microdrive, I have 340MB of internal storage and no cabling.

I recently visited LotusSphere in Berlin. The book I am currently writing is on the microdrive. I can work on it using the Jornada and save the chapters internally and on the microdrive. In addition, I can use the drive in the Canon Pro 70 where it promises over 600 large (1,600 x 1,200) high-quality images. Best of all, I can swap the drive between these two devices, viewing the images on the Jornada at the end of the day.

One thing to be wary of is the physical design of the CF+ Type II slot that you have. The full standard defines all sorts of things: the size of the slot, the number of pins, the interface - all that jazz. What it doesn't say is there has to be a mechanism for ejecting the cards from the slot. So it is possible to create a PDA which has a Type II slot which meets all of the specs, but from which it is almost impossible to remove the card. The worst case would be a hole in the side of a device - easy to put the card in, but



SNAPIT FROM WWW.XOAN.COM OFFERS THE DELIGHTS OF A COLOUR SCREEN CAPTURE PROGRAM FOR WINCE MACHINES



leaving no part of the card protruding to make it easy to remove.

IBM doesn't want you to mangle the drive or use pliers, so it says in the small print that the drive shouldn't be inserted into any slot that doesn't have an ejector mechanism. In fact, devices like the Casio E100 don't have an ejector mechanism, but the slot isn't flush with the case either. Part of the card is exposed, and I found it possible to remove the drive without applying excess force. But bear in mind this was my experience with a particular drive and device; and it clearly makes sense to follow IBM's recommendation.

■ Look, no wires

I've raved in the past about how great it is to be able to network a Windows CE device and I still do; no use for travelling, but great at home or work.

The January issue carried a feature that I wrote on wireless networking. For reasons explained there, the particular network configuration I eventually adopted means I can't currently use a wireless card in a PDA, but there is no reason you have to be bound by the same restrictions.

For peer-to-peer networks, this is already possible and I have no doubt it will become generally the way to connect PDAs to the world because it makes so much sense. OK, so this is the middle of winter, but think of sitting in the garden in the summer, happily surfing and answering email.

■ Opening doors

As I put this column together, the Psion 7 is in late beta and is due to go into production shortly. I'm not reviewing it here (it will be covered elsewhere in PCW) but one thing worth noting is that at last Psion has cast aside its obsession with proprietary plug-ins. The incorporation of a CF+ Type II slot in the Psion 7 is to be greatly applauded. I commented several months ago on Psion's tendency to stick with closed standards and I am now happy to say I firmly believe that in

moving to open standards, the company has taken a big step towards ensuring its survival.

■ A question of reliance

Chris Kirby of kirbyb@post.queensu.ca emailed me to ask about the reliability of the Psion series, especially with regard to a factory-refurbished Series 5.

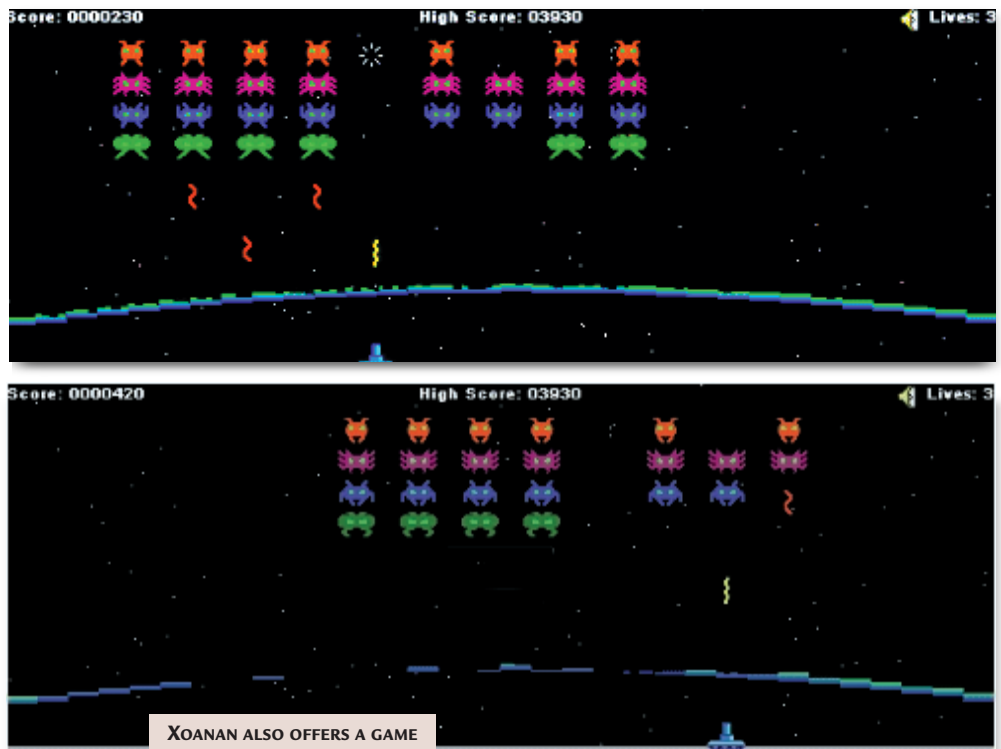
I have found all the Psion range to be outstandingly reliable. There were early problems with hinges on the first Psions (although my Psion 3 has survived intact for years) but in general the Series 3

directly into the agenda file, and since the agenda file format for Series 5 is not known, it is not possible to make a Series 5 version of HOL.'

Rather poignantly his (or her) home page reads 'Welcome to my page. It ain't much (especially after the disk-crash) - but I call it home.'

■ Hallelujah for Nokia

A rather mysterious Barry of barry@gena.freeseerve.co.uk emailed me to sing the praises of using a Nokia 9110 instead of a plethora of different devices



XOANAN ALSO OFFERS A GAME CALLED MARTIANS, WHICH LOOKS HAUNTINGLY FAMILIAR

range is fine. The early 5s suffered from the rubber coating peeling off. Admittedly, my original one now looks like a dog with mange, but it runs perfectly. I think the general feeling is that these are thoroughly reliable machines.

As to factory refurbished, if it is the original factory doing the work, I would expect the PDA to be as reliable as the original (but look to see what guarantee is offered).

Chris also brought my attention to a great holiday program for the 3mx which allows you to customise the holidays in Agenda. It can be found at <http://decus.se/~gripenol/hol.html>.

It isn't available for the Series 5 because, as the author says: 'HOL writes

just to send/receive faxes and emails.

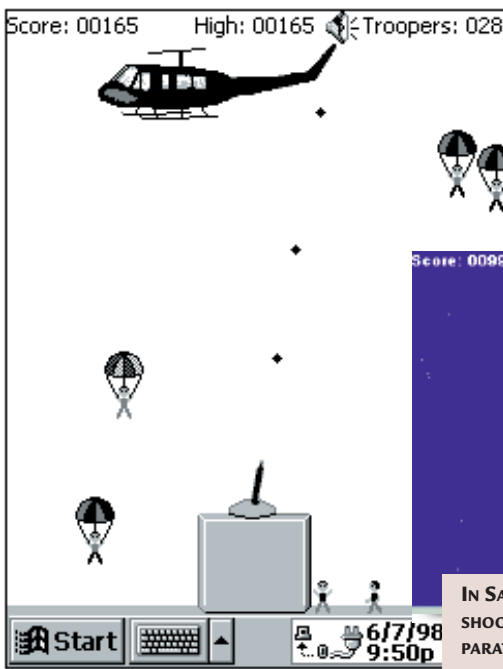
Having played with cables, infra-red modems and links, I would agree that if you want to work with email, phone and fax communications, a composite device such as the Nokia is an excellent solution.

Things may change in the future, of course, but such kit seems to be the best all-round solution.

Nokia's machines seem among the most competent and usable on the market, although it would be even easier to recommend them if the company did something about improving the user interface which is, as we say politely, less than optimal.

■ Screen capture

I've covered screen capture several times



clone (see previous page and screenshot on opening page) and Sabotage.

■ PDA alternatives

Two readers tell me of their defection to the world of mini PCs.

everybody's needs are different. If a PDA doesn't offer what you want, an alternative must be sought.

The Stylistic, Libretto et al offer an alternative way of working and appeal to many. The availability of certain software is especially persuasive if you must have a particular package.



IN SABOTAGE YOU HAVE TO SHOOT DOWN THE PARATROOPERS BEFORE THEY TAKE OVER YOUR BASE

in these pages and capturing a colour image from a Windows CE device still presents something of a problem. I haven't yet come across a freeware solution, but Steve Otteson from Xoanan Industries www.xoanan.com contacted me about his company's screen capture software. Called SnapIt, it costs \$10 (£6). The site also contains some other utilities and games, including a

Space Invaders

jm@wanadoo.be who enthused about the PD-1100 from Palmmax. This is similar to the Libretto, but comes with Windows 98 and all accessories bar modem for under £1,200.

The other reader was Greg Parker TechnoMage1@newscientist.net who also turned traitor, this time with a Toshiba Libretto 100CT including all the add-ons. He wrote in some time ago complaining about the lack of a CE equivalent to Mathcad. With the Libretto he can have Mathcad, Mathematica and Matlab on the move.

He says you can get around some of the power consumption problems by booting off the hard disk and with a configured PCMCIA RAM card in the slot, turn off the hard drive to enjoy longer battery life. He reckons the gains outweigh the increased boot-up time.

Despite being a confirmed PDA user myself, I appreciate

The first was Jeremy Main

Coincidentally, I've just looked at the Fujitsu Stylistic LT which is a pad device that can be used out of the office like a PDA and docked on return to the office to form essentially a desktop PC.

I found two major headaches with using the Stylistic in the way I'd use a PDA, and these coincide with the problem areas Greg pinpoints in his email. Using Windows 98 has a very different feel to using a PDA: first, the boot time is long (apparently interminable compared with the instant gratification provided by a PDA) and the battery life is abysmal (about 1.5 hours) compared with a PDA.

Greg also pointed me in the direction of www.cemonster.com which he describes as 'the best CE software site going'.

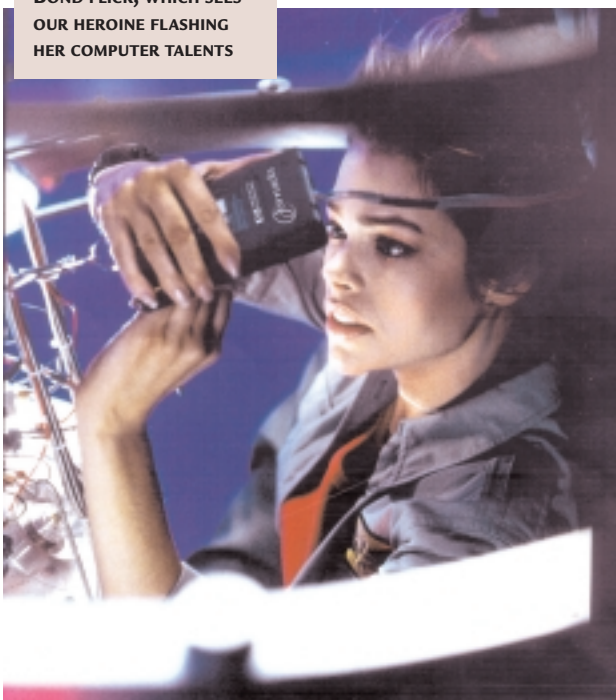
■ Shaken, but not stirred

Most of us are used to getting dubious emails. I was surprised to receive one that looks suspect from a respectable source, the PR company for Hewlett-Packard. Maybe I am being a little bit oversensitive, but something labelled BondGirl made me wary. I needn't have been. It is in fact a shot from the latest Bond movie where the heroine uses the HP Jornada.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the PDAs column. Contact him via the PCW editorial office or email pda@pcw.co.uk

A SCENE FROM THE LATEST BOND FLICK, WHICH SEES OUR HEROINE FLASHING HER COMPUTER TALENTS





The power of the pipe

Chris Bidmead takes some **pipeline code on a driving test**: manoeuvre, signal, reverse, find a space...

The other morning I needed to come up with a string representing the name of the newest file in a particular directory. From the command line, the simplest way to achieve this is by using:

```
ls -t <directory> | head -1
```

In other words, list the files in <directory>, newest files first (ls -t) and pipe the result into the head utility, chopping off all but the first line.

There's a nice opportunity here to explore the power of the pipe at the Unix command line. The example above is oversimplified, because there's a chance, of course, that the most recent file – the one at the top of the ls -t list – isn't a file. It could be a directory.

Another way of achieving the same thing would be to change the grep pattern

An easy way to distinguish files from directories is by using the -l switch to create a 'long' listing. This gives you an expanded list that includes the attribute flags as well as the date-last-modified of each file and its size (see Fig 1).

Now if you just want to list the directories, you can do:

```
ls -l | grep ^d
```

In other words, pipe the full listing to the grep filter utility and only allow through the lines beginning with a letter d (the caret represents the beginning of the line).

To do the reverse – filter out the directories – it is possible to negate the grep with the -v switch (think inVert). By the way, the discussion here relates to the GNU version of these common Unix tools. On proprietary systems your mileage may vary.

Now we can expand our original short pipeline a bit:

```
ls -lt | grep -v ^d | head -1
```

This effectively says: 'Give us a long listing, in inverse date order, filter out the directories, and then filter out everything except the first line.'

However, it doesn't quite work in the way that you might expect, because the -l switch creates a summary first line, which

gives a total of the number of files:

```
total 1198
```

This means we need to extend the pipeline a step further, increasing the head lines to two and then use tail (the inverse of head) to isolate the second line:

```
ls -lt /etc | grep -v ^d | head -2 | tail -1
```

giving:

```
-rw-r--r-- 1 root root 1650 Oct 15 08:15 issue
```

(Key: ✓ code string continues)

Another way of achieving the same thing would be to change our grep pattern and look for that -r which starts the flag array for normal files. This is complicated by the need to protect the

hyphen with a backslash so that grep doesn't think it's a command switch, and

then wrap the pattern in single or double quotes to insulate it from the shell.

```
ls -lt /etc | grep '\-r' | head -1
```

The new grep pattern slightly changes the rules. Links (where the flag array begins with an 'l') are now excluded, whereas a negated '^d' still allowed them. And we're also now insisting that the file should be readable. We probably don't want links and we do want a readable file, so let's stick with this.

But we're not done yet. We wanted

just the filename. But because we're using the -l switch to ls we end up with a line full of other stuff such as flags, ownership and date. Is there an easy way to strip this away?

The heavy duty way of breaking up a line is with awk, but there's a lightweight utility we can use here called cut. Cut can operate in various ways, but in the present context we'll think of the line as a series of fields. As you can see, the filename is in the ninth field, so we might expect the cut command to be something such as:

```
cut -f 9
```

But, we're not quite there yet, because we have to tell cut what delimiter we're using to separate the fields. The default is a tab, but there are no tabs in the line. We'd like to use a regex such as /[]+/ (one or more spaces), but, alas, cut doesn't understand regexes. Cut lets us use only a single character to indicate the field boundaries, so in a line whose fields are broken by one or more spaces we have no way of counting to the ninth field.

We could isolate the first field very nicely with:

```
cut -f 1 -d " "
```

This is because we know there are no spaces in the flag field, so the first space must demark the end of the field.

Let's change the exercise and say I want to end up with a string that contains the flag field of the newest

(FIG 1)

drwxr-xr-x	3	root	root	1024	Jul 19 18:13	CORBA
-rw-r--r--	1	root	root	2241	Aug 11 20:53	DIR_COLORS
-rw-r--r--	1	root	root	24	Sep 8 09:33	HOSTNAME
-rw-r--r--	1	root	root	41	Aug 6 18:29	MACHINE.SID
-rw-r--r--	1	root	root	5441	May 9 19:14	Muttrc
drwxr-xr-x	15	root	root	1024	Aug 11 11:26	X11
-rw-r--r--	1	root	root	10	May 26 01:55	adjtime
-rw-r--r--	1	root	root	732	Apr 13 1999	aliases
-rw-r--r--	1	root	root	16384	Jul 19 18:21	aliases.db
-rw-r--r--	1	root	root	406	Apr 27 14:19	anacrontab
-rw-----	1	root	root	1	May 18 23:28	at.deny
-rw-r--r--	1	root	root	302	May 25 13:27	bashrc
-rw-r--r--	1	root	root	130	Oct 12 08:16	bc.conf



PhaserLink™ Printer Management Software for the Phaser® 840 Color Printer

Current Status for printer named: Phaser 840DP / TEK0A4173

Status	
Printer Status:	Ready
Media Tray:	A4, Paper
Ink Status:	Ok
Pages Printed:	372
Maintenance Kit Remaining Life:	9779 Pages

Default Printer Settings	
Print Quality Mode:	High-Resolution / Photo
TekColor Correction:	Automatic
Image Smoothing Enabled:	No
Media Source:	Media Tray

[Start status update](#)

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MOST NETWORK PRINTERS CAN BE ADMINISTERED REMOTELY, BUT THIS TYPICALLY REQUIRES SPECIAL SOFTWARE RUNNING ON THE CLIENT MACHINES. THE GREAT JOY OF A WEB SERVER IS THAT IT'S TOTALLY CROSS-PLATFORM. THE WEB PAGE IN THE SCREENSHOT IS FROM THE LATEST TEKTRONIX PHASER 840, WHICH IS NOW CAPABLE OF PRINTING PHOTO-QUALITY COLOUR ON BOTH SIDES OF THE PAPER

```
sed -ne 's/^.*:[0-9][0-9][ ]*//; p'
```

■ **My FIFO-LIFO email queue**

Spencer Lavery (species1@playaz.greatxscape.net) wrote to me this month with a question that keeps cropping up about 'any sites where I could either download Linux (preferably the latest version) or order a CD for free'.

He was mailing from a Windows system using Microsoft Outlook Express, and, like many beginners, had it set to do HTML by default. I mentioned the unnecessary crud this adds in my reply to Spencer, and also told him - as regular readers will already know - that The Linux Emporium (<http://linuxemporium.co.uk>) is a great place to get all kinds of Linux (and other) CDs at a range of prices, from zero pounds upwards. John Winters who runs the outfit has a laudable policy of giving away older versions of the GPL distributions.

Spencer wrote back (in plain ASCII, which was cool): 'I just want to say thank you again for your amazingly quick and helpful response. I was unsure if you would reply as it was an old issue I was reading, but I am pleasantly surprised'.

Other readers who've emailed me may also be wondering about that 'amazingly quick' response. I revealed my secret to Spencer:

Well, I have a queue of incoming email for the column that's about a month long. This in itself isn't impressive, and if I just keep answering all my mail a month late that isn't too impressive either. So I cheat and alternately answer mail at the beginning of the queue and at the end. That way I build half a reputation for responding quickly to email... :-)

■ **Web servers everywhere**

They say that in a few years' time our fridges and freezers will all have web

readable plain file in a directory. Here's the pipeline to do that:

```
ls -lt /etc | grep "\-r" | head -1 | cut -f 1 -d " "
```

QED. Er... but as you've noticed, I cheated by changing the goal. What we really want is the last field.

But, hey, the last field is the first field - it just depends on how you look at it. The utility for looking at a line backwards is called rev.

If we pipe our output through rev just before the cut operation, we get:

```
essi 51:80 51 tc0 0561  
toor  
toor 1  
--r--r-wr-
```

So now we just apply the cut as before and pipe the output from that through another rev - to get the filename the right way round:

```
ls -lt /etc | grep "\-r" | head -1 | rev | cut -f 1 -d " " | rev
```

Of course there's one pesky case where this fails - if the filename contains a space, as under Unix it's perfectly entitled to do. I'm not too bothered, because pipelines such as this are typically quick fixes used in '80 per cent solutions'. In any case this has been an exercise in pipelining, not an attempt at rock solid program building.

But if you can think of an improvement that covers this case I'd love to hear from you. Stick to pipelining simple,

standard utilities - Perl is cheating (isn't it always?).

The best I can do for now improves on the above by taking us into the murky reaches of sed, the streaming text editor. But this relies on the fact that the filename doesn't contain a colon followed by a couple of digits. It's a more remote eventuality than an embedded space, but by no means a watertight assumption.

```
ls -lt | head -2 | tail -1 |
```

servers in them, so we can quiz them about their contents. Back in the summer of 1997 I showed you the web server in my Tektronix Phaser solid inkjet printer. This lets you check the status and change parameters remotely, and also contains links to online documentation.

Network printers should be comfortable with any operating system. However, the Tektronix Phaser range has a particular empathy with Unix, because it contains its own BSD-like print queue and you can treat it like any remote Unix machine with a local printer attached to it.

This snippet from my /etc/printcap file – which was created using the Red Hat printtool utility – illustrates the point:

```
##PRINTTOOL3## REMOTE ✓
POSTSCRIPT 600x600 a4 {} ✓
PostScript Default 1
lp:\
    :sd=/var/spool/lpd/lp:\
    :mx#0:\
    :sh:\
    :rm=tek:\
    :rp=AUTO:\
    :if=/var/spool/lpd/✓
lp/filter:
```

The printer's internal queue, called AUTO, includes a magic filter than can distinguish between PostScript and PCL. This means that the input filter line (:if above) added by printtool is unnecessary in this context.

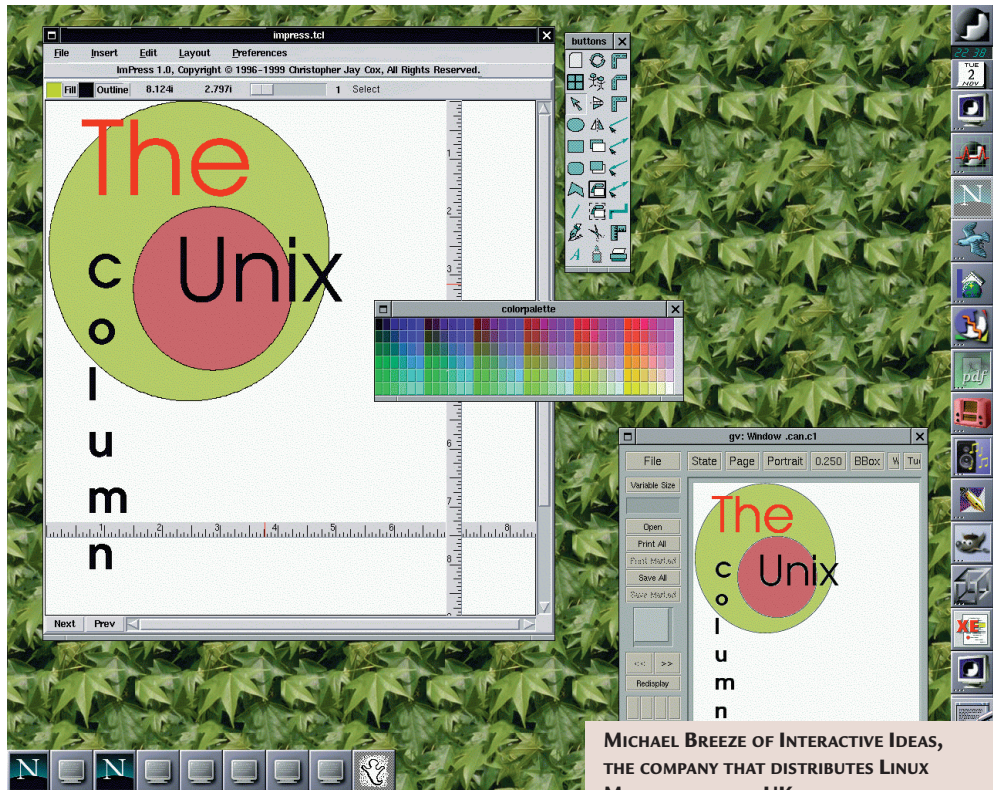
But of course not everyone has a network PostScript printer. It's when you're working with a low-cost printer attached to a Unix machine that this input filter comes into its own. For example, I used it to turn a modest old Canon BJ-10e bubblejet into something reasonably equivalent to a PostScript laser printer.

To do this you need Ghostscript, the

free PostScript emulator that comes with most Linux (and many other free Unix) distributions. Full details about how to set this up are in the Printing HOW-TO and the Printing Usage HOW-TO (which you can find at, for example, www.metabolab.unc.edu). But the bare bones of it go like this...

The output that your application directs to the printer gets stacked in a local queue, typically in a directory somewhere below /var/spool/lpd/. Once there, it is intercepted by the filter, which analyses it in order to guess what kind of printer it's meant for. The filter (strictly speaking a set of filter scripts and utilities that interact) will then rewrite the file as PostScript.

But the BJ-10e, which you could probably pick up in a charity shop these days for about £5, isn't a PostScript printer. Well, yes it is, because Ghostscript just made it one. Instead of sending the file directly to the printer, the input filter mechanism diverts it to Ghostscript, which in turn converts the PostScript page-by-page into a set of



MICHAEL BREEZE OF INTERACTIVE IDEAS, THE COMPANY THAT DISTRIBUTES LINUX MANDRAKE IN THE UK, HAS SENT ME A STACK OF LINUX UTILITY CDS PUT TOGETHER BY A GERMAN OUTFIT CALLED HEMMING. ON ONE OF THEM, GRAPHIC, SOUND AND MULTIMEDIA FOR X, I FOUND SOMETHING CALLED IMPRESS, A VECTOR-BASED LAYOUT PROGRAM FOR CREATING PRESENTATIONS AND POSTSCRIPT DOCUMENTS. IT TOOK ONLY A MOMENT TO KNOCK UP THIS LOGO. THE BOTTOM RIGHT-HAND WINDOW IS GHOSTVIEW, A FRONT END TO GHOSTSCRIPT, WHICH IS DISPLAYING THE POSTSCRIPT FILE CREATED BY IMPRESS

The BJ-10e isn't a PostScript printer. Well, yes it is – Ghostscript just made it one

low-level graphics instructions the BJ-10e can handle.

This depends on Ghostscript knowing about the internal codes used by your printer. You can check the list of known devices – you'll find it bundled with your distribution in a file called devices.txt. A more recent version of Ghostscript – including drivers for more printers, but under a less liberal licence – can be found at: www.cs.wisc.edu/~ghost.

PCW CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email unix@pcw.co.uk

The Hemming CDs cost £4.99 from Interactive Ideas (0208) 805 1000 or you can download Impress directly from www.ntlug.org/~ccox/impress



Easy driver

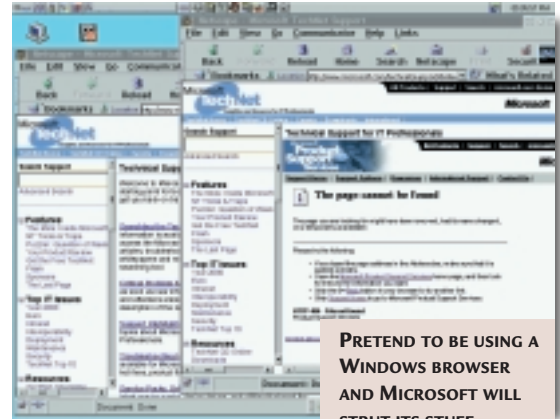
Terence Green goes in search of decent drivers and FTP clients but ends up just browsing.

Isn't it amazing the way computers turn simple tasks into time-consuming adventures? A 1980s study, possibly apocryphal, claimed that 10 years of personal computing had zero effect on white-collar productivity because work expands to fill the time allotted.

I was going to explain how to get RealPlayer working with Netscape 4.6.1 for OS/2. However, I ran into problems, principally the difficulty of finding a decent OS/2 driver for an audio card with an ESS Maestro-2 chip. Don't ask me why I decided to remove a working Pine card to fit the Maestro immediately prior to trying to get RealPlayer sound working. No doubt the answer is in the aforementioned productivity study. Noting the absence of Maestro drivers

for OS/2 on the ESS Technology website I should have replaced the Pine card since drivers for its ESS-1869 and the entire 18XX range can be found at www.esstech.com. This is a useful site if your notebook has an ESS chip. You can go there directly or via the IBM Device Driver Pak Online at service.software.ibm.com/os2ddpak/html/multimed/esstechn/index.htm.

For my part I continued to bang my head against a brick wall. Apparently there are Maestro-2 drivers somewhere but they're useless. Finally I gave up and moved on to the next reader question, but if you want to go ahead,



PRETEND TO BE USING A WINDOWS BROWSER AND MICROSOFT WILL STRUT ITS STUFF

have a look at the Unofficial Home Page for the OS/2 Netscape Navigator at people.netscape.com/law/os2nav/index.html. It's a little old, but a good starting point.

FTP for OS/2

There are lots of shareware FTP clients on sites such as 'OS/2 Must-Have Utilities' at www.musthave.com, Hobbes at hobbes.nmsu.edu and the OS/2 SuperSite at www.os2ss.com. Free FTP clients which have been praised in the newsgroups include NcFTP, a command-line FTP client, and AWGet, a PM front end for WGet FTP which requires the EMX runtime.

EMX runtime is required for OS/2 applications developed with EMX, an OS/2 port of the free GNU C compiler. It can be downloaded from various sources including Hobbes, but the latest version should be available at [ftp.leo](http://ftp.leo.org/pub/comp/os/os2/leo/gnu/emx+gcc/).

org/pub/comp/os/os2/leo/gnu/emx+gcc/.

To install EMX one only has to extract the files from the compressed archive by running the executable, add the relevant EMX directories to LIBPATH and PATH in CONFIG.SYS, and reboot. The EMXRT.DOC release note has slightly longer instructions for 'impatient users'!

Once I had installed EMX, NcFTP ran like a dream. I couldn't quite get to grips with AWGet, even though it seems very clever, but I will continue trying.

Coincidentally EMX reared its head again when I was reading about Star Office from Sun. As you may know

Sun acquired Star Division and has been giving it away as a free download from Sun (www.sun.com) or on a CD containing all versions including OS/2 for around \$10 (£6.25).

According to OS/2 Netlabs (www.netlabs.org) a bug in the EMX compiler is holding up testing for further OS/2 versions of Star Office.

Incidentally, if you avail yourself of the Sun Star Office offer, please check the FTP support site as there are some fixes. The ones I've heard of are at ftp.stardivision.de/pub/support/so51a/sync/os2icci3/syncptc h.exe and [ftp://ftp.stardivision.de/pub/support/so51a/db/os2icci3/s db517co.dll](http://ftp.stardivision.de/pub/support/so51a/db/os2icci3/s db517co.dll).

The next question looked easy. It was about OS/2 FTP clients, but I was soon mired in the Internet. Clive Shearsby wondered whether there was a standalone FTP client for OS/2. Indeed there is. Warp includes both command line (FTP.EXE) and PM (FTPPM.EXE) clients. But they're old (c.1994) and not particularly exciting. They're also not Year 2000-compliant. More on this shortly.

Personally, I don't often use FTP and anyway, OS/2 Netscape versions after 4.04 have basic FTP services. But this is not enough to glorify them with the FTP client tag, even though they reportedly support the REGET command which allows an interrupted download to be restarted. The catch is that your Netscape Disk Cache has to have sufficient free space to hold the entire file, otherwise you won't be able to restart.

I also noticed several complaints about Netscape for OS/2 aborting downloads or locking up after moving the mouse cursor over the Saving Location window. It didn't sound good, so I went looking for FTP clients.

That was when I found, buried deep within IBM's online documentation for Warp, hints that there were some Year 2000 problems with FTP and a few of the

other TCP/IP services in Warp. Nothing serious apparently, but it led me to look into TCP/IP updates. Shortly afterwards my head started hurting. A lot.

I didn't know this, but Fix Packs don't update any TCP/IP functionality. And there are two entirely separate update streams for Warp TCP/IP. One set of updates fixes the TCP/IP protocol STACK, while the other addresses the TCP/IP SERVICES aka applications, FTP for example.

The distinction is important. It didn't take long to discover that TCP/IP updates are a can of worms. All Warp clients have 16bit TCP/IP stacks. Warp 3 has TCP/IP version 2, Warp Connect has version 3, and Warp 4 version 4. Type INETVER at a command prompt to see the version you have.

You can hang in there with the 16bit update path, which looks like it has reached the end of its life, or head out on the 32bit path towards TCP/IP 4.2. The easy way to 4.2 is through a Software Choice subscription. This takes you to the 4.1 stack and includes all the TCP/IP application updates. Then you can add the 4.2 update. But it looks as if Software Choice won't be available after 1 January 2000 to poor end users seeking a single subscription.

You can get to the 4.2 stack through an update but this won't include the applications. If you take this path, you can update the applications separately as they don't mind whether they're on the old 16bit stack or the new 32bit stack.

To get the new 4.2 stack, you need MPTS service pack WR08620. This can be installed on any version of the OS/2 Warp client. However, before you can install WR08620 you must first install WR08610. Once you have the stack

New tricks for old browsers

Here's an interesting one. Open one of the support pages on the Microsoft website in the Netscape for OS/2 4.61 browser. I went to the Support home page at www.microsoft.com/support, selected TechNet from the drop-down window on the left, and got the standard 'page cannot be found' HTTP 404 error.

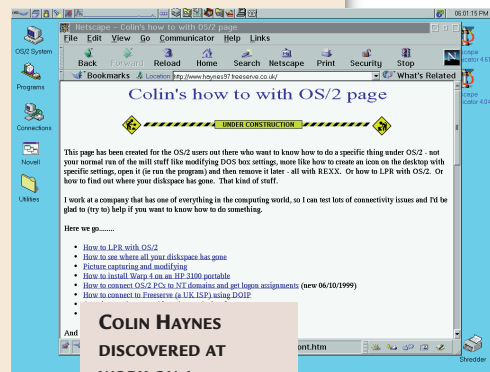
Now have a look in the Release Notes section of the Netscape 4.61 Help menu. It contains instructions for editing some of the User Preferences in the PREFERENCES file. Add the following line to the file.

```
user_pref("os2.
emulate.windows"
, true);
(Key: code string
continues)
```

I pasted it in at the top under the warning against editing the file. Now go back to the Microsoft page that caused the HTTP 404 'page cannot be found' error. Surprise! Funny old world, isn't it. Footnote: Colin Haynes has put up his own OS/2 page at www.haynes97.freeserve.co.uk.

The page has useful information on networking, printing and

OS/2 to NT connectivity. Colin has contributed to the column in the past but was too mod-



**COLIN HAYNES
DISCOVERED AT
WORK ON A
CONSTRUCTION SITE**

est to seek a plug here. I found the page during an Internet search. You can run, Colin, but you can't hide...

sorted you can then move over and start applying TCP/IP service updates.

I know this isn't terribly clear, but this is because the whole process did my head in. The nearest I've found to a helpful site so far is www.warpupdates.de/english/warpupdates.html and even then it makes my head hurt. Hopefully

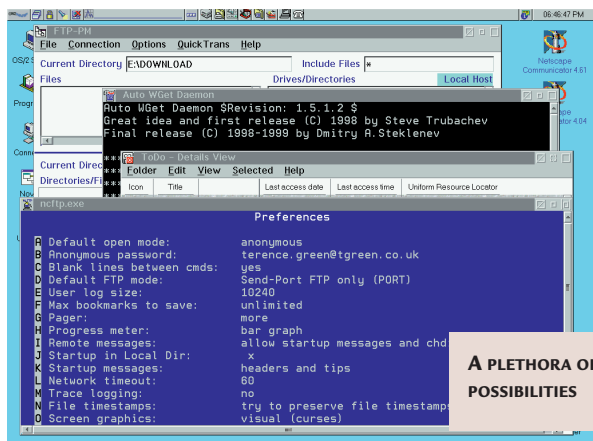
you'll be able to make sense of it all.

■ **Adieu**
Unfortunately, the time has come to say goodbye to this column. There's a large and vocal OS/2 community on the

Internet and in the newsgroups, but everything changes with time and PCW

**FANCY A
HEADACHE, DEAR?
JUST TRY AND
WORK OUT WHICH
TCP/IP UPDATES
YOU NEED**

OS	Date	Product/Component	Ver/Bld	Lang.	Notes
W*	1999-10-17	Driver: Scrollmouse	2.03		
W3M	1999-10-17	Corrected SYSLEVEL.MPM for Warp Server SMP	XR03006		fix if <i>MultiMedia</i> is not selectable during FixPak installation, for US version only!
W*	1999-10-12	Driver: LaserJet, OMNI, Postscript, Plotters	30.702		
W3S, W3M, W9S/NT4	1999-10-12	IBM Networks Client for Windows 95/NT FixPak	IP08315		
W4C	1999-10-01	FixPak for the base operating system	XR_M012		look at readme.lst for popups during installation!
W3S, W3M	1999-10-01	FixPak for the base operating system	XR_W042		
W*	1999-09-26	Driver: Intelligent I/O	10.028		storage and transport devices
W*	1999-09-26	TCP/IP Components	*		Due to some requests for advice, the TCP/IP section has been reorganized (sorted after questions now). If there are still questions about the upgrade path or if you have proposals for further improvement, sent an E-Mail to



**A PLETHORA OF FTP
POSSIBILITIES**

PCW CONTACTS

Although this is the last OS/2 column, you can contact Terence Green for the remainder of the month at the PCW editorial office or email: os2@pcw.co.uk

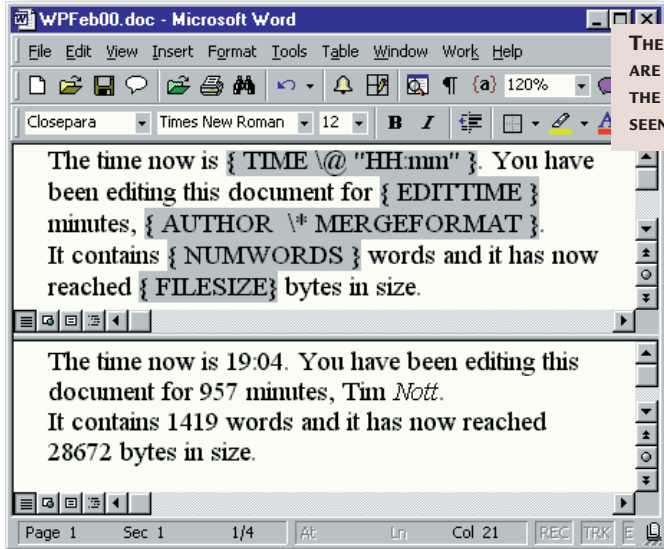


Having a field day

Tim Nott proves that it's possible to **take control** of your documents by ploughing the right fields.

Recently I've had a lot of enquiries about fields. Not the agrarian sort, but those that generally lie fallow on most Word users' Insert menus. Fields are little bits of code that can be located anywhere in the text of a document and do things automatically – a sort of kid brother to macros. To take an example, when you insert a page number, you're not just inserting dumb digits, but a field that will keep track of what the page number should be as the document changes. You can switch between viewing the result of a field, and viewing the code that creates that result, in Tools, Options, View – simply tick or untick the Field Codes box. Fortunately there is a shortcut: typing Alt & F9 toggles between viewing results and codes. Keep that F9 key handy, as you'll be seeing a lot of it.

If you look through the names in the Insert Field dialog, you'll see there are a lot of tasks that they can perform. Fields can be used to insert information about the document – such as the file size, author or number of words. They can be used to cross-reference documents, create indexes, mail-merge letters or prompt the user to enter information. They can even perform mathematical calculations on tables of figures, like a simple spreadsheet. Unlike Excel, fields don't update themselves continuously – although on opening the document they should update certain aspects, such as printing, repagination and dates and



THE FIELD CODES ARE ON TOP, AND THE RESULTS CAN BE SEEN BELOW

times. To update a field manually, press F9 while the cursor is in the appropriate field or while the field is selected.

Fields can consist of several parts, but usually you have a name, some arguments and a switch. Arguments are what you want the field to work with – a set of numbers to be added or a bookmark to reference. Switches are used for formatting. The most common one you'll see is the *mergeformat switch, which stops any of the character formatting you've made to a field result being changed when that field is updated. Other common switches include numeric and date 'pictures' – \@ "dd MMMM yyyy", presents a date in the format 25

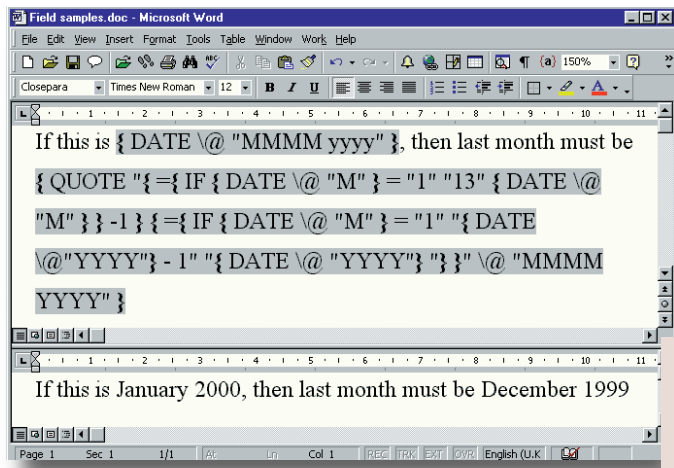
statements. When you come to create nested fields, the going can get thorny. For a start, it's annoying to keep opening and closing the dialog box – it's actually easier to type in the code. However, you rapidly find

out that typing curly braces from the keyboard, or copying and pasting from a help file, doesn't actually work, as they don't possess the magical qualities of those inserted from the dialog. The secret is to press Control & F9. This not only inserts the proper magic braces, but does so in pairs, which saves much debugging. Another tip is to turn off smart quotes in Autoformat As You Type. Word 2000 appears to have an ambivalent attitude within fields: it sometimes inserts curly quotes (which don't work), and sometimes inserts straight ones (which do).

■ Putting it into practice

Now that we have fields under control, it's time to put them to some real-world uses. First, a really simple one: Joan Carey wanted to find a way of creating Click Here blocks in Word templates, similar to those found in Word Pro SmartMasters. These are blocks of text, usually offering some instructions, such as Click Here and Type The Address. When the user clicks and starts to type, the prompt text disappears.

To do this in Word takes a little cunning. First you need to create a macro. From Tools, Macro, Macros type in a name: I use Dummy. Make sure the Macros In box shows the template you are editing. The VBA editor will appear in all its glory, and



PLOUGH THROUGH THIS FIELD TO GET LAST MONTH'S DATE

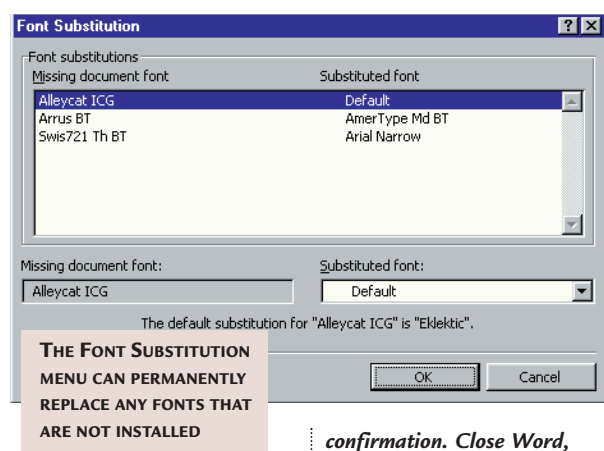


Questions & answers

Q How can I get Word 97 to open and automatically load the last document I've been working on, without using the Windows recent documents list?
MALCOLM ELMs

a First of all you need to create a macro to open the most recent document, as follows:
Sub Resumework()
RecentFiles(1).Open
End Sub
Make sure this is stored in Normal.dot. Now create a new shortcut to Word in the usual way. Edit the shortcut properties and add a space after everything in the Target box, followed by /mResumework. This will load Word, and run the macro which you have just created.

Q I have acquired a number of Word documents that use a variety of fonts, and need to standardise these to use only those fonts that are installed on our systems. How can I get a list of fonts used, or convert these, other than by scrolling right through each document?
GREGORY MANSER



a Tools, Options, Compatibility, Font Substitution should do exactly what you want. It lists all the fonts that are used in the document but not installed on the PC. You can then permanently convert all references to these to point to any installed font.

Q Is it possible to change the font that Word automatically provides for me in the first blank page (which I assume is produced from Normal.dot)? I want to open Word and find the font as Arial 10pt.
DAVID GLASS

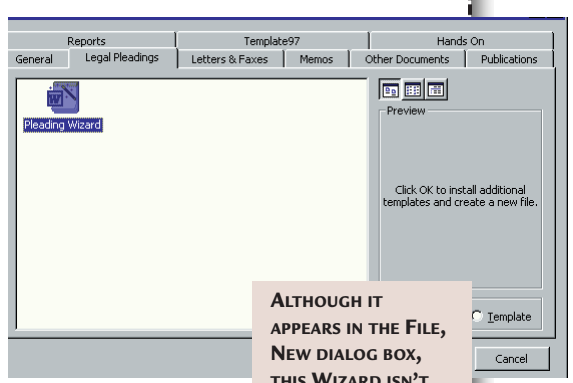
a Start a blank document. Go to Format, Font. Change to Arial 10pt, hit the Default button, then Yes the

confirmation. Close Word, and reply Yes to confirm the Changes to Normal.dot. That's all there is to it.

Q Is it possible to get rid of all the phantom templates and tabs on the Word 2000 File, New dialog box? I'm never, ever, going to want to create Legal Pleadings or Elegant Faxes, and I can't find the .dot files anywhere on my PC.
HARRY BOSTON

a This is all part of the Install-on-Demand feature of Office 2000. As

you surmise, the templates aren't on your hard disk at all, but if you go to use one of these templates or wizards you get prompted to insert the CD-ROM, and they are then copied over.
Although I have rather a soft spot for the Pleading Wizard, which sounds like a Terry Pratchett character, it is possible to get rid of these. You need to go to Control Panel, Add/Remove Programs, Microsoft Office 2000, and hit the Add/Remove button. This will start the Office Setup in maintenance mode. Navigate your way from Add and Remove Features down to



ALTHOUGH IT APPEARS IN THE FILE, NEW DIALOG BOX, THIS WIZARD ISN'T REALLY THERE
Word templates and change the settings from Install on First-Time Use to Not Available. This will remove the Pleading Wizard and his phantom friends.

you can close it straight away, as you now have a macro that does nothing except exist, which is all we ask of it. Now Insert, Field, MacroButton with the arguments Dummy Click Here and Type The Address. You don't need any quotes or delimiters - the field treats the text before the first space as the macro name and the rest as the prompt text. Save this template. What you'll see in documents based on the template is just the prompt. One click selects the field - ie all the prompt text - and the next keystroke replaces the text and removes the field.
The other request came from Padraig

McCarthy, and was deceptively simple. 'Each month I prepare a report requiring the previous month to be inserted a number of times. Is there a way to set up the template so that it will insert a field for the previous month rather than the current one?
Indeed there is, and my hearty thanks go to Dave Robb, Mike 'Seethru' Strong and the mysterious Mr Path for helping with this one. The trick is to use a QUOTE field, which simply displays quoted text. This may seem utterly pointless, but it allows you to include other fields and do formatting tricks that would otherwise be

impossible. So, without going through the gory details, the hideously complex field (see screenshot, bottom left on opening page) works out the previous month, with IF fields taking the special case of January into account. This returns two numbers, which the date picture switches in the Quote field formats to suit.

PCW CONTACTS
Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email wp@pcw.co.uk



A matter of interest

It's judgement day, and Stephen Wells works out what you owe and preaches the converted.

Recently had an email from Rakesh Mohan in New Delhi asking if there was any built-in function in Excel 97 to calculate the interest paid on a reducing loan balance.

Yes, there is – but the results may not necessarily concur with a real-life situation. It very much depends on how the institution is calculating its loans. But you can see how Excel's available functions work for a fixed interest loan from the example in the screenshot opposite.

This loan is for £20,000 (entered in cell B1) to be repaid over 30 months (B2), with the payment at the end of each period, repaid and recalculated monthly. The annual interest rate is seven per cent (B4). If you wish to first calculate the monthly payment you would enter (in B5):

`=-PMT(B4/12,B2,B1)`

The minus sign is to compensate for the fact that Excel's payment (PMT) function provides a negative answer. The interest rate is divided by 12 because the interest payments are credited monthly in this example. Following the conditions specified for the loan in question, the

monthly payment would be £728.64.

Excel offers the PPMT function, which calculates the amount devoted to repaying principal for any specific monthly payment. You could use this and deduct the result from the regular total monthly payment. But to find the portion of a particular payment devoted to interest, it is easier to use the IPMT (interest payment) function. Enter the completed months in which you're interested in row three. Then enter:

`=-PMT(B4/12,B3,B2,B1)`

in B9, and:

`=-IPMT(B4/12,C3,B2,B1)`

in C10.

Obviously, if the loan institution is seeing you right, with every monthly payment you make the amount of interest paid will decrease, because you will have paid off more of the principal loan. In the example given here, £116.67 of the first month's payment is for interest, whereas it's only

	A	B	C	D
1	Loan	£20,000.00		
2	Total Months	30		
3	Completed months	1	30	
4	Annual interest rate	7%		
5	Monthly Payment	£728.64		
6				
7				
8	Interest paid -			
9	in 1st month	£116.67		
10	in 30th month		£4.23	
11				
12				

£4.23 of the last month's payment.

CALCULATING THE PORTION OF THE FIRST AND LAST MONTH'S REPAYMENT OF A LOAN DEVOTED TO INTEREST

Price conversion

While we have gone with the European metric system, many other countries – such as the US – still adhere to the old Imperial measures. Obviously this means that some people are going to need a simple method to convert between the two systems, and a spreadsheet is the ideal tool to do the job.

Screenshot 2 opposite suggests one way of producing the conversions. As it's not easy to enter pounds and ounces in one cell, they have been divided between columns A and B.

The custom formatting in each cell is simply 0"lbs" in A and 0"oz" in B. Similarly, kilograms and grams are divided between columns D and E. The cells in D are custom-formatted 0.0 "kg" and in column E, ###"g". The space between the number and

the text is optional. The Imperial weights are shown randomly in the example, to demonstrate they don't have to be entered in numerical order. Column C is hidden and holds the primary formula, which in cell C2 is:

`=CONVERT(($A2*16)+$B2,"ozm","g")`

(Key: ✓ code string continues)

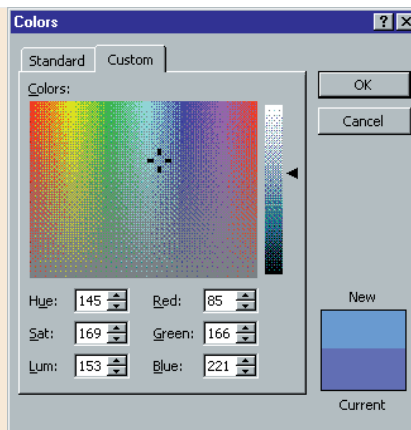
Colour-fill pages

When you choose the Fill Color tool in Excel, you are offered 40 colours, including black and white. This has always been more than adequate in the past, when you often only needed red, green, yellow or blue to make a point on a worksheet. But now that we are all getting used to the subtleties of colour on our home-made websites, we are tempted to be a bit more adventurous. It's easy to change one or more of those standard

colours to reflect your new aesthetic sensibilities.

Choose Tools, Options and the Color tab. Click on the closest colour to the one you're shooting for, then the Modify button. Move around the colour chart until you find what you're looking for. A square at bottom right of the dialog box shows the standard colour in the lower half and your replacement above it.

When you're satisfied, click OK. The



new colour will now be available in your current workbook. It will retain its old name when you hover over the Fill Color or Font Color tools, but will be called Color Scheme on both drop-down palettes.

Hints for Excel users

■ Copying headers and footers

Click on the worksheet that has the header and/or footer you want to copy. Choose File, Page Setup. Click OK in this dialog box. Hold down the Ctrl key and click on the tabs for the worksheets which are also to have this header or footer. Press F4. Then right-click on any of the grouped tabs and choose Ungroup Sheets.

■ Hiding data

If you have a block of data which is mostly monetary amounts but has some cells with text or zero values in

them and you format the range with the Currency tool, the text or the currency mark (such as £ -) will be displayed. But if you wish the text and zero values not to display this you can use the following Custom format: £0.00;-£0.00;; .

■ Journey times

As you're not likely to be driving for more than 24 hours at a stretch, here's a way to display the estimated time of a motoring trip. If the length of the journey (in miles or kilometres) is in cell B8 and the average speed (in

mph or kph) is in B9, enter $=(B8/B9)/24$ in B10. Then Custom-format cell B10 with h "hrs" m "mins". As an example, if the distance is 345 (miles or kilometres) and the speed is 40 (mph or kph) then the journey time of 8 hrs 37 mins will be displayed.

■ Weeding out duplicates

It is easy to cull duplicates from a list. Say cell A1 has the heading, 'Names'. Below that is a list of people, with some of them duplicated. Click within the list. Choose Data, Filter, Advanced Filter.

Choose, Copy to another location and Unique records only. You can ignore the Criteria range box. Click on the red arrow on the Copy to box and highlight the range where the second list is to appear. Click OK. The second list will then display each name only once.

■ Animation

If you like to see (or don't want to see) some animation of the process of inserting or deleting rows and columns, you can change it under Tools, Options, Edit, Provide feedback with Animation.

	A	B	D	E
1	Imperial		Metric	
2		4oz		113g
3		8oz		227g
4	4lbs		1.8 kg	
5	1lbs	2oz		510g
6	3lbs	12oz	1.7 kg	
7	2lbs	8oz	1.1 kg	
8		15oz		425g
9	4lbs	5oz	2.0 kg	
10		12oz		340g
11	1lbs	8oz		680g
12	2lbs	4oz	1.0 kg	
13				

SCREENSHOT 2: A SIMPLE TABLE FOR CONVERTING IMPERIAL WEIGHTS TO METRIC. OR YOU COULD MOVE TO CALIFORNIA

be converted to grams. Then we specify we are converting ounces mass (not liquid) to grams. The formula in cell D2 is $=IF(\$C2>1000, \checkmark \$C2/1000, 0)$ which says that if the answer in C2 is more than 1,000g, enter the result in kilos in D2. The formula in cell E2 is: $=IF(\$C2<1000, \$C2, 0)$ which says that if the answer in C2 is less than 1,000g, enter it in E2. These formulas are then dragged down their columns.

If you wish to convert the price-per-pound of items to price-per-kilogram, you could use the example in screenshot 3. Here both columns use the standard built-in currency formatting, with the usual two decimal places. If you wish to use the current common divisor, enter:

$=\$A3/0.4536$

in cell B3, then drag down the column. The results of this conversion won't

B to 16 times the number of pounds in column A. This totals the number of ounces to

necessarily tally exactly with the prices that are displayed in your local

SCREENSHOT 3: HAS THE PRICE OF APPLES GONE UP? THIS TABLE CONVERTS A PRICE PER POUND TO A PRICE PER KILO

	A	B
1	Imperial	Metric
2	Price per lb	Price per kg
3	£0.10	£0.22
4	£0.30	£0.66
5	£0.60	£1.32
6	£0.90	£1.98
7	£1.00	£2.20
8	£1.50	£3.31
9	£2.50	£5.51
10	£3.50	£7.72
11	£4.50	£9.92
12	£5.00	£11.02
13		

supermarket (as they often round £5-per-pound to £11-per-kilo), but it will put you in the right area.

PCW CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk

◆ Please do not send attached files unless they have been requested.

We are using the Convert function found within the Engineering category of Excel's Analysis ToolPak. This will change a number from one measurement system

To change a number from one measurement system to another use Excel's Convert

to another. The first argument is the number to be converted. Here we are adding the number of ounces in column



All change, please

Mark Whitehorn explains why **changing properties** needn't be as difficult as moving house.

The topic for this month is how to make multiple changes – first to data in the

database and then to the database itself. I didn't plan it this way, it came about from a couple of emails that I received. At first glance they seemed to be unrelated, but as I wrote the column I discovered they went together like penguins and snow.

So let's start with the data. Redouane Doumer emailed with the following: 'I have been given a database. One of the tables contains suppliers' details. One of the fields includes the telephone numbers, but for some reason, the '0' is missing at the beginning. Because the table includes more than 3,000 records, I wonder if I could run a query that will add the missing '0', rather than doing it manually?'

An UPDATE query should do the trick. Given that the name of the field is, for example, TelNo, then the SQL expression to use in the update query will be something like:

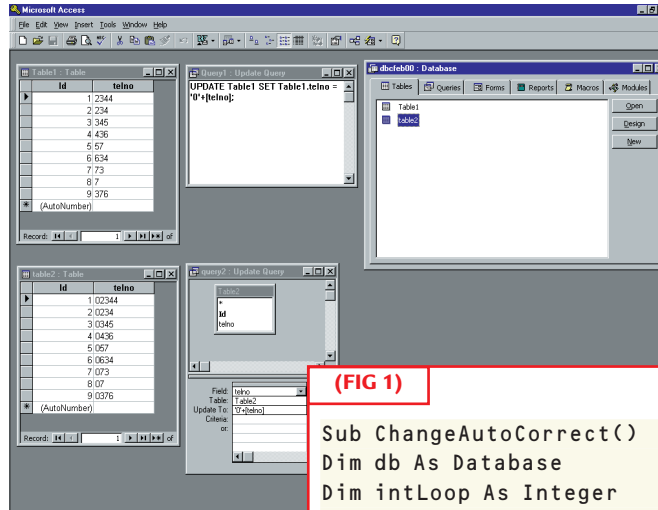
```
UPDATE Table1 SET Table1.telno = '0'+[telno];
```

(Key: ✓ code string continues)

Clearly you will have to substitute the appropriate table and field names. You can build this in raw SQL or use the Access query builder (see the screenshot, above).

Remember, before you start, it's important to make sure that the TelNo field you have inherited is a text field and not a number field.

This is clearly a specific answer to Redouane's question, but it applies generally. You should never have to manually update lots of individual records. If you haven't come across update queries before, they are well worth investigating in detail because they can do so much work for you, enabling you to make changes to all (or some) of the records in a table with a single command. Is it a bird? Is it a plane? No,



UPDATE QUERIES REMOVE THE NEED TO MANUALLY CHANGE SETTINGS

extensive database over a number of months. Then, one day, you realise that you need to change the property of every instance of a

it's Update Query!

As a rather pathetically obvious plug, update queries are covered in more detail in the *Inside Relational Databases* book that can be purchased from PCW. However, before I get too smug, that noble tome totally fails to say anything at all about the next subject, so read on.

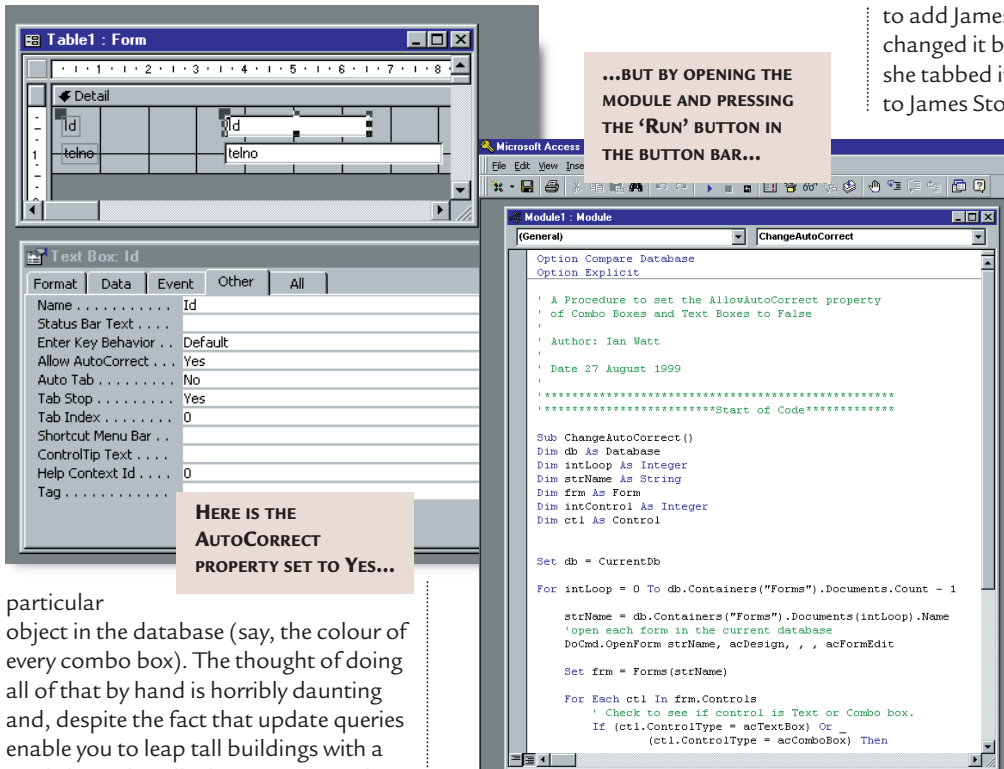
Databases contain more than just data, they also contain lots of other objects, such as forms, queries, etc. Objects such as forms contain other objects, such as text boxes, combo boxes, etc. All of these objects have properties such as colour, size, etc.

Suppose that you have hand-crafted an

(FIG 1)

```
Sub ChangeAutoCorrect()  
Dim db As Database  
Dim intLoop As Integer  
Dim strName As String  
Dim frm As Form  
Dim intControl As Integer  
Dim ctl As Control  
  
Set db = CurrentDb  
  
For intLoop = 0 To db.Containers("Forms").Documents.Count - 1  
  
    strName = db.Containers("Forms").Documents(intLoop).Name  
    'open each form in the current database  
    DoCmd.OpenForm strName, acDesign, , , acFormEdit  
  
    Set frm = Forms(strName)  
  
    For Each ctl In frm.Controls  
        ' Check to see if control is Text or Combo box.  
        If (ctl.ControlType = acTextBox) Or _  
            (ctl.ControlType = acComboBox) Then  
            ' Set control properties.  
            With ctl  
                .AllowAutoCorrect = False  
            End With  
  
        End If  
    Next ctl  
  
DoCmd.Close acForm, strName, acSaveYes  
Next intLoop  
  
End Sub
```

(Key: ✓ code string continues)



HERE IS THE AUTOCORRECT PROPERTY SET TO YES...

particular object in the database (say, the colour of every combo box). The thought of doing all of that by hand is horribly daunting and, despite the fact that update queries enable you to leap tall buildings with a single bound, sadly they are not much use here. But there's more than one way to skin a database...

To prove that this isn't an abstract problem, this solution came about as an answer to a real problem. Ken Sheridan's email in the November column pointed out that Microsoft's AutoCorrect feature could have 'interesting' consequences for database users. If the AutoCorrect property for a control on a form is set to True then it can change correctly-entered data into something that might be desirable elsewhere, but is totally inappropriate in the current context. He pointed out that setting the control's AutoCorrect property to False cures this problem.

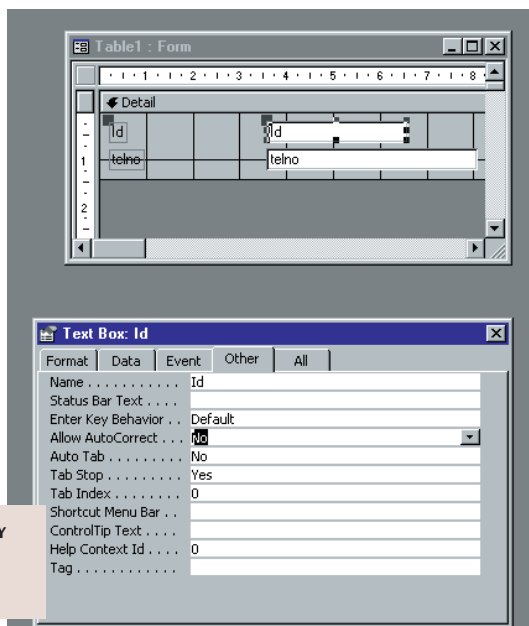
This clearly struck a chord with several readers. In particular, the same problem had already caused Ian Watt some serious grief and he emailed me with a generic cure.

Ian has a group of users who share a database, with copies of the front end on the PCs and the data tables on a server. Values

...IT MAGICALLY CHANGES THE PROPERTIES

can be entered into a combo box, which then auto-completes the nearest match, taking values from a table on the server. If no matches are found, the user is offered the chance to add the data to the table.

One user found that, when she entered a value (eg James) it picked up a value for James Stick stored in the table. When she tabbed to the next control, the value in the combo box was changed to James Stock and it offered her the chance



to add James Stock to the table. She changed it back to James Stick and when she tabbed it again it changed once more to James Stock and she was offered the chance... loop ad infinitum.

This happened on no other PC. The data tables are shared and even when the front end was copied from a PC on which it worked to her PC, the problem persisted.

After much work it was discovered that this user had set AutoCorrect in Microsoft Word to change 'stick' to 'stock' and Access had inherited this command.

Ian found the same solution as Ken (namely, that setting the control's AutoCorrect property to False cured the problem) but realised that the

same problem potentially lurked in all the controls in all his existing databases, some of which had numerous forms with many Combo and Text Boxes. His solution is an elegant piece of code (see Fig 1 on opposite page).

An Access database that demonstrates this is available on this month's cover disc. I have copied the code to this sample database and if you run it, it will change the properties of the objects in the forms.

How can you use this code more generally? You simply add references to the properties that you want to change. For example:

```
' Set control properties.
With ctl
    .AllowAutoCorrect = False
    .BackColor = .BackColor + 1
End With
```

has the bizarre effect of altering the background colour of the controls every time the code is run.

As always, this code is provided with no guarantees; be sure to back up your database before trying it. But it worked when I tried it.

PCW CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the PCW editorial office, or email: database@pcw.co.uk



Another helping of chips

Gordon Laing digs deep and **uncovers the Coppermine process** then lives life to the DVD MAX.

In a packed *Hands On Hardware* this month we've got details on performance and compatibility issues with Intel's new raft of Pentium III chips, news of a software DVD player that can generate SPDIF output to Dolby Digital decoders and, by popular demand, updates on my dual over-clocked Celeron PC.

But first those new chips. In late October 1999, Intel announced no fewer than 15 new Pentium III processors, ranging from 500MHz to 733MHz. Many are made with Intel's 0.18micron manufacturing process, codenamed Coppermine. This finer manufacturing method boasts several advantages compared with the previous 0.25micron 'Katmai' process, thanks to what happens when transistors are placed closer together. There are four advantages:

- It takes less power to make them work
- They generate less heat
- You can make them go at faster speeds
- Closer transistors means physically smaller chips – hence more squeezed onto a single wafer and greater yields.

Changing manufacturing processes is no small task, so for some time Intel will be selling Pentium IIIs made with both its 0.25 and 0.18micron processes. Additionally, some Pentium IIIs are designed for a 100MHz front-side bus (FSB), while others are designed to run at 133MHz FSB. This could be confusing,

so a chip labelled with an E suffix refers to the Enhanced

0.18micron process, while the B suffix mean it's designed for a 133MHz FSB. Intel's new range includes four 600MHz Pentium IIIs, labelled 600, 600B, 600E and 600EB. At the time of writing, the 600 and 600B were priced at £295 and £309, while the Coppermine 600E and 600EB parts weighed in at £305 each.

The finer Coppermine process has

allowed Intel to incorporate 256KB of Level 2 cache directly onto the die. This not only saves physical space and cost, but it also drives the cache at the core processor speed.



Previous Katmai Pentium IIIs drove their Level 2 cache at half the core speed, but featured 512KB of the stuff.

So which is better: 256KB running at full speed, or 512KB running at half speed? Intel explains the Katmai's 512KB L2 cache is two-way set associative, compared to the Coppermine's 256KB L2 cache being eight-way set associative. The direct-mapped cache efficiency is calculated as its size multiplied by its set associativity. Coppermine boasts 256 x 8, which equals 2MB, compared to Katmai's 512 x 2, which equals 1MB.

Intel claims that this higher efficiency, along with running at double the speed, boasts an overall L2 cache performance

increase of up to three times. But how does this impact general applications?

One of the

first tests was run by Tom's Hardware (www.tomshardware.com), which reckoned the Coppermine chips were about 10 per cent faster than Katmai chips of the same clock speed across general office applications and games. Since the new chips are actually cheaper and the finer process has potential over-clocking benefits too, new buyers should

be choosing Coppermine chips over older Katmai models where both are available. These Pentium IIIs come in the 500, 533, 550 and 600MHz speeds, so ask for the new E versions! The 650MHz chips upwards are all Coppermine, and don't need an E label to differentiate them.

More power, but less voltage

All but two of the new desktop Pentium III processors are SECC-2 cartridge designs, but can you simply drop one of these into your existing Slot-1 motherboard? Perhaps

unsurprisingly, there are differences. The B-suffixed chips, which include 533, 600, 667 and 733MHz speeds, are designed to run on 133MHz FSB. This requires

YOU'RE MY BIGGEST FAN! THE COOLTUM, LEFT, COMPARED TO INTEL'S STANDARD S370 CELERON FAN, RIGHT

using a motherboard containing one of Intel's new official chipsets, or a Taiwanese solution which uses a VIA or tweakable BX chipset. Anyone wanting to play safe on an existing BX motherboard should check out the 500, 550, 600, 650, and 700MHz Pentium IIIs, which are designed to run at 100MHz FSB. My aging Asus P2B motherboard, for example, supports 100MHz FSB and clock multipliers up to eight times, in half-step intervals.

Interestingly, a 133MHz FSB does not necessarily result in memory running at the same speed. Intel chipsets do not (and are unlikely ever to) support 133MHz SDRAM, with the chip giant preferring to stick with PC100 memory until the RAMBUS situation is resolved.

In an official Intel 133FSB solution, only the communication between the chipset and the CPU is running at 133MHz. This could explain why early

New buyers should definitely be choosing Coppermine chips over Katmai models

tests show little overall performance benefits for a 133MHz FSB over 100MHz. Taiwanese motherboards are, however, likely to drive the memory at the same speed as the FSB, so any 133MHz wannabees had better make sure they've fitted PC133 SDRAM memory.

Coppermine groupies had better watch the voltage being supplied to their brand spanking new chips. While Katmai was happy with a voltage range of around 1.93-2.07v, the new Coppermine ones operate in the range of 1.52-1.69v – nominally that's about 2v compared to 1.65v, so anyone popping one of these into their motherboard must ensure they've suitably adjusted the supply. Sometimes this is automatic, while at other times you'll need to adjust it manually. My advice is to check your motherboard manufacturer's website for Coppermine processor compatibility issues – it may involve a BIOS update.

■ **Size does matter**

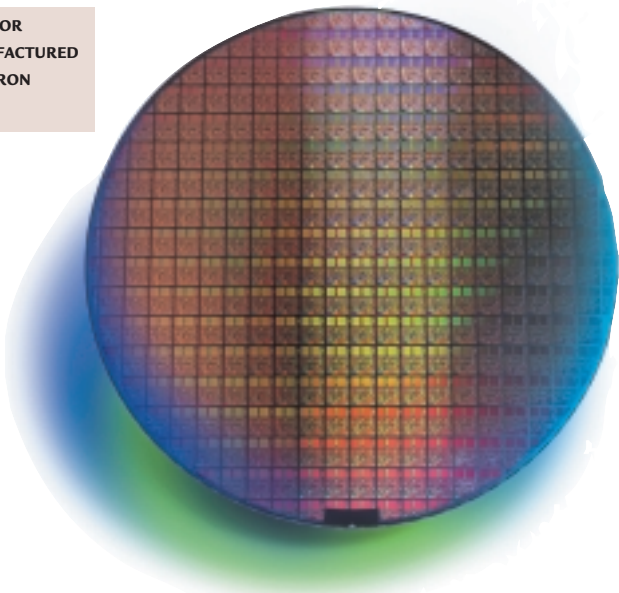
Of course if the L2 cache is on-die, there's no need for that big, nasty SECC-2 cartridge any more, and indeed Intel's announcement included two new Coppermine Pentium IIIs featuring a socket interface. They run at 500 and 550MHz, and both employ a 100MHz FSB.

These new socketed PIIIs employ a design known as a Flip Chip Pin Grid

Array (FC-PGA), while existing socketed Celeron processors use a Plastic Pin Grid Array (PPGA). The actual silicon faces down on the PPGA Celerons, whereas it's flipped over to face upwards on the FC-PGA PIIIs, and hence makes direct contact with the heatsink.

Interestingly, the FC-PGA package has the same number of pins and the same physical dimensions as the PPGA, which allows it to fit

A PENTIUM III PROCESSOR WAFER WHICH IS MANUFACTURED USING INTEL'S 0.18MICRON PROCESS TECHNOLOGY



perfectly into existing S370 motherboards. However, before getting too excited about these implications, let us delve a little deeper.

First you'll need a supporting chipset, but while Intel pushes its new 800 series, don't forget the old BX chipset has been working with the Pentium III for ages. And despite many cheaper ZX chipsets proliferating in the Celeron market, there are plenty of Socket 370 motherboards with BX chipsets. So surely if you reduced the supply from 2v down to around 1.6v, you'd be forgiven for thinking you've got a neat potential upgrade on your hands.

I'm afraid not. Intel's obviously thought about this, and has sneakily fitted two reset pins onto its socketed PIIIs and put them in a place where existing 'legacy' Socket 370 BX boards won't know to look.

Hence your chipset, voltage and dimensions may be fine, but drop one of these new chips into your old motherboard and nothing will happen.

So where can you use the new Socketed PIIIs? For now, only on new Socket 370 'flexible' motherboards, which employ Intel's budget 810E chipset (incidentally also backward compatible with PPGA Celerons). The 810E may be suitable for cheap all-in-one solutions, but as

all gamers know, its integrated i752 graphics processor just doesn't cut the high-end 3D mustard.

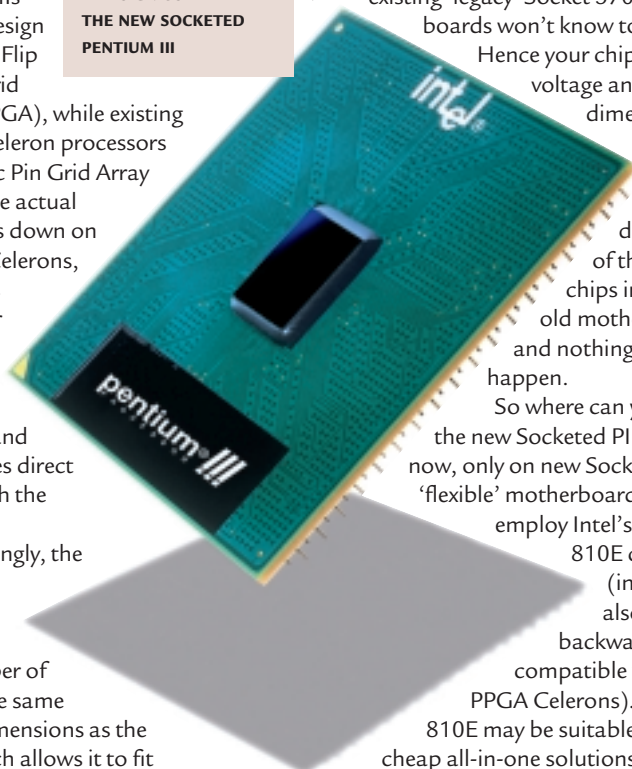
It's a huge shame that BX-board Celeron owners can't just lower the voltage and pop in a socketed PIII processor. It's even more infuriating when you consider the tweaking potential of the Coppermine process, which should eventually produce chips approaching the magic 1GHz. Imagine: the 550MHz FC-PGA Pentium III with fixed 5.5-times clock multiplier, may just be persuaded to operate at 733MHz when the FSB is over-clocked to 133MHz. Considering the FC-PGA 550MHz PIII costs £249 compared to £525 for the Slot-1 733MHz PIII, that's a potential bargain I'm desperate to try out.

■ **Dual thoughts**

My original desire was to try out a pair of Socketed PIIIs in my Abit BP6 dual-S370 BX motherboard – until I found out about the reset pins. The sad answer is that the Abit BP6, like other legacy S370 motherboards, will not support FC-PGA Pentium IIIs. So saying, it's a fair bet the Taiwanese will come up with a decent (perhaps 840 chipset-based) dual-socket PIII solution in the near future, or perhaps they'll develop some kind of FC-PGA to PPGA convertor. In the meantime, I'm still getting plenty of mail from readers who've tried out the dual-Celeron system described in last month's *Hardware* column, so here's a quick update on how mine's getting on.

The biggest performance differences are still in Adobe Photoshop, which continues to fly along at all times.

THE FLIP CHIP PGA – A DESIGN USED BY THE NEW SOCKETED PENTIUM III





Software DVD update

Back in the October 1999 issue, this column discussed the pros and cons of DVD movie playback using a PC, covering hardware, software and hybrid solutions. As PC processors speed up and motion compensation becomes standard on all graphics cards, software decoding and playback is becoming an increasingly attractive option – after all, by eliminating the hardware, you literally eliminate most of the cost.

However, by getting rid of your dedicated hardware decoder card, you're also losing several useful outputs – first is the TV composite or S-Video socket, and next you'll be mourning the loss of the SPDIF digital audio output. The latter is vital to anyone wanting to hear full 5.1 channel digital surround sound, as you need this socket to connect to your external Dolby Digital AC-3 decoder and speaker system.

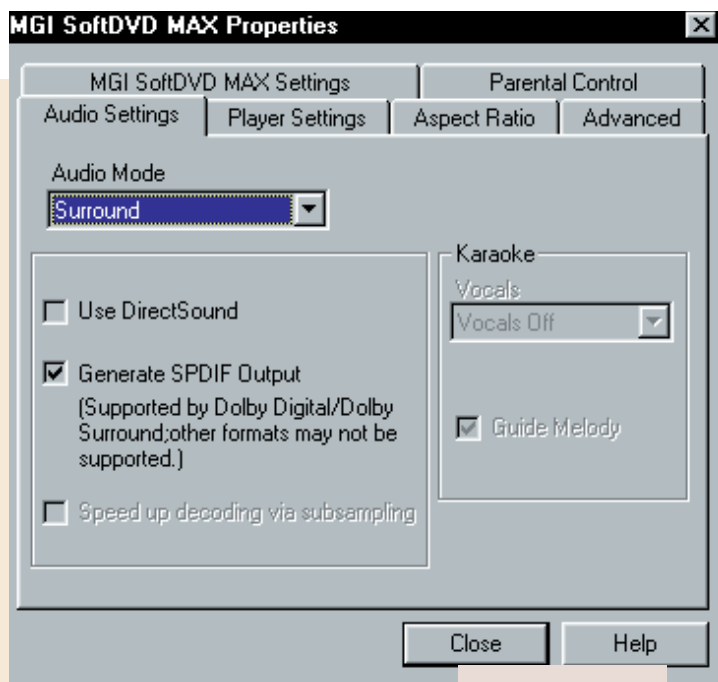
But anyone who has spent longer than is healthy behind their PC may have noticed that these outputs exist on other cards. Most video cards offer TV output,

and many sound cards boast digital SPDIF output in either optical or electrical form. In October I commented that it was a shame existing software DVD players couldn't somehow redirect the Dolby Digital bitstream from the disc to an existing SPDIF output in your system.

Well, I was wrong because there are two available. The first is a bit pricey, costing £35. It's the Power DVD software from Cyberlink. But thanks go out to Colin Crawford of VideoLogic, who pointed me in the cheaper direction of the latest version of MGI's SoftDVD MAX.

This is often bundled with video cards, and is available as a download from MGI's website for only £14. Simply open the configuration panel, click on the audio settings and select Generate SPDIF output.

Now instead of the software decoding audio into plain analog stereo, which at best will only support Dolby ProLogic surround, SoftDVD MAX will squirt the Dolby Digital bitstream out of



your SPDIF port. My Aureal Sonic Vortex sound card obeyed, and its optical connection with my Meridian 565 Surround processor promptly switched it into processing proper Dolby Digital 5.1.

It sounded absolutely great working under Windows 98, but failed to run under RC1 and 2 of Windows 2000.

Fans of DTS 5.1 digital surround sound will be disappointed – but not surprised – to learn that this version of SoftDVD MAX does not recognise and output the DTS bitstream

on suitably authored titles.

There is a hardware decoding solution that does support DTS. It's employed on RKR Video's Titan and Cassini DVD players, which also boast scaled non-interlaced RGB output.

This is all down to the fact that they are essentially nothing more than PCs fitted with DVD-ROM drives and decent decoder cards – cunning stuff indeed.

www.mgisoft.com
www.rkrvideo.com

SOFTDVD MAX CAN NOW GENERATE SPDIF OUTPUT TO SUPPLY THE FULL DOLBY DIGITAL 5.1 BITSTREAM

However, if the program runs out of RAM and has to go to the hard disk, the CPUs immediately become idle. So as I pointed out last month, a dual system (or indeed one with a single fast chip) will only make use of its processing muscle while data is constantly being supplied – and that means plenty of RAM and as fast a disk as you can find.

I've also found a source of hefty fans ideal for keeping over-clocked chips relatively chilled. The Cooltium from TopPC (www.toppc.co.uk) may have

been designed for AMD K6 processors, but does a good job on a Socket 370 Celeron. It spins at 4,500rpm, so it can shift a lot of hot air away from the CPU, and costs a tenner. Crash-wise, my system still seems reasonably reliable when my 366s are over-clocked to 550MHz, although upgrading to Release Candidate 2 of Windows 2000 has increased the number of blue screens. Hopefully, this will be corrected in the final code due in February 2000, but tweakers should bear in

mind my crashes so far are down to over-clocking and not the presence of two chips. I may not be able to pop in any socketed PIII, but I can always fit faster Celerons in the future and leave them clocked normally.

PCW CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Contact him via the PCW editorial office or email: hardware@pcw.co.uk



Live! goes Platinum

Steven Helstrip is impressed with the **latest Sound Blaster Live!**, an all-in-one beginner's bundle.

I've just spent the past three days reinstalling and optimising my system following a fatal, and very untimely disk crash. Here at PCW we're always going on about the importance of backing up your data. But did I? No, of course not, because it always happens to someone else. Or so I thought.

My audio drive remains intact, but all my documents, along with your emails, have disappeared into hyperspace. So if I haven't replied to any of your queries, please re-send them to the usual address. And while you're at it, why not spend some time backing up your data? I wish I had.

■ Creative expands family

Creative has announced a new addition to its SoundBlaster Live! family, called the Live! Platinum. Although based on the original card, Creative says this one's better equipped for high-end audio production. Similar to E-mu's APS, the Platinum comes with a front panel module to provide easy access to audio connectors, including inputs and outputs for MIDI and SPDIF, headphones and a microphone. As well as a few hardware modifications, the package is bundled with 'Lite' versions of Steinberg's Cubase VST, WaveLab and ReCycle. And if that's not enough to tempt you, it also comes with Mixman Studio, Sound Forge XP and an MP3 encoder.



CREATIVE'S LIVE! IS NOW EVEN BETTER FOR MAKING MUSIC

The Platinum is built around the same EMU10K processor as existing Live! sound cards. Although over a year old now, its versatile design means there's still plenty of mileage to be had out of it. In this configuration it is capable of handling up to 1,024 sampled voices, decoding surround sound and applying numerous effects to multiple audio sources. With some serious games thrown into the sub-£200 deal (Half-Life: Day One, Descent 3 and others) I'm even thinking of buying one myself.

new effects, applications and Internet audio utilities. It's quite a hefty download at 27MB, but it's well worth getting hold of. For more info about the Platinum and Liveware 3, point your browser to www.sblive.com.

Liveware 3 adds hundreds of functions, including new effects and Internet audio utilities

■ Free VST 2.0 instruments

In last month's column I mentioned the imminent release of Steinberg's LM4 drum machine for the VST 2.0 plug-in format. Although I haven't got my hands on a copy yet, I have been sent the very first two shareware instruments. The first is a twin oscillator, analog-style synth called Mono One. Each oscillator has selectable wave shapes and there's a simple envelope offering attack, decay and release parameters.

The second instrument is a virtual plug-in sampler, which looks like an Akai S series. The shareware version is limited to playing back just one sample, but it's very useful all the same. For example, it allows you to try out sounds within a mix before going to the effort of making a SoundFont bank. Both instruments are available free from www.multimania.com/scdevelop/indexa.html.

If you already have a Live! sound card, you should also note that Creative has released version 3 of its Liveware software. This adds hundreds of new functions to the card, including



HERE ARE THE FIRST BATCH OF VST 2.0 PLUG-INS: GET 'EM WHILE THEY'RE HOT

So, how do you go about using these instruments? At present, only Cubase VST 3.7 supports VST 2.0 plug-ins, although there are plans for Logic Audio to support the format in the near future.

To install the plug-ins, simply copy or extract the .dlls to your Cubase plug-ins directory. The next time Cubase starts up, they'll be ready for use.

From the Audio menu, select VST instruments to display the Instrument Rack. Next, choose one of the instruments from the pop-up menu in the same way you would load an effect plug-in. To play the instrument, click on the output port of any MIDI track and select the instrument device.

Depending on your sound card, the amount of latency (the time it takes for sound to arrive at your speakers after pressing a key) may vary anywhere between five and 800ms. You can check the exact latency by looking in the Audio System dialog (Audio menu). For true real-time playback, ideally your card should have a latency less than 40ms.

If you're using a Sound Blaster Live! with MME drivers, the latency at 48KHz is a whopping 750ms. This can be reduced by changing to the DirectX driver in Audio System, although this will prevent you from recording audio. This shouldn't be the case for much longer, though, as I've heard ASIO drivers are in the pipeline. This should significantly improve the latency, probably to around 20ms.

In the meantime, if latency is preventing you from playing real-time, first record a part with a hardware synth, then output the part via the VST instrument. You can then offset the latency by entering a negative value in the delay parameter box.

■ **Evolution Music Creator 61**
 All-in-one music packages for the PC are

Questions & answers

Q Following numerous recommendations, I recently bought myself a copy of VAZ plus, the software synthesiser. Although the program is happy to run on its own using its built-in sequencer, I'm not having much luck using it with Cubasis.

I have installed the

HLB virtual MIDI driver, but when I select this port from Cubasis and play a few notes, my PC comes to a standstill. I'd really like to solve this one, can you shed any light?

JAMES NICOLSON

a It sounds as though you're creating a MIDI feedback loop with the virtual MIDI driver. When you press a key on your keyboard, the note events are sent into

Cubasis, and back out via the virtual MIDI port. From the symptoms you describe, it's possible the output from HLB is arriving back at the input of Cubasis and being sent on a never-ending loop, hence the system halt. To stop this you need to disable the HLB MIDI input inside Cubasis. Simply run the Setup MME utility, select the HLB input driver and click Inactive. That should do the trick.

something of a rarity, so when Evolution's Music Creator came my way I felt obligated to give it a mention here. Although this isn't the first bundle Evolution has put together, my first impressions tell me it's going to be one of the better ones. For a start it includes a well-featured

The keyboard takes its power directly from your sound card via the MIDI interface. This plugs in around the back, where you can also find connectors for a sustain pedal and a Mac-type serial port.

One really useful feature of the MK-261 is



WITH FIVE OCTAVES OF KEYS AND A CONFIGURABLE CONTROLLER WHEEL, EVOLUTION'S MK-261 KEYBOARD IS AN EXCELLENT CHOICE FOR DESKTOP MUSIC

audio/MIDI sequencer, a MIDI interface cable and some music tuition software. For many, though, it will be the keyboard itself that is of most interest.

In the past, Evolution hasn't quite got its keyboard designs right. The keys on the MK-149 were too light and flimsy, while the Dance

that its modulation wheel can be configured to send any CC data. This enables you, for example, to control the filter cut-off of an instrument in real time. Similar to the keys, the control wheels feel solid and should therefore stand up to some serious abuse.

Unless you're buying second hand, you'd be hard pushed to find a better keyboard for less than £200. And if you're just starting out with a computer music set-up, then the included software will be an added bonus.

Station package had solid keys, but only one octave. The keyboard included here, the MK-261, has all the right credentials: five octaves of full-size keys, set buttons for program/bank select, pitch bend and modulation wheels and a MIDI volume slider. And as far as the action, or touch, of the keys is concerned, there are no complaints there, either.

PCW CONTACTS

Steven Helstrip welcomes your feedback on the Sound column. Contact him via the PCW editorial office or email sound@pcw.co.uk
 Contact Evolution on 01525 372621
 Price £174.99 (£149 ex VAT)
www.evolution.co.uk



Extreme measures

Ken McMahon explains how a **PDF-based approach** takes the uncertainty out of those final stages.

Sending pages to an output bureau can be a worrying, even traumatic experience. Preflighting, using either software or your own checklist to make sure there are no nasty little accidents, such as process colours defined at spot plates or RGB picture files waiting to trip you up, can reduce the heartache. But collecting all those files and sending them off to the bureau will probably never be an entirely stress-free exercise.

One of the worries is that you rarely get to see a page before its PostScript has been rasterised and rendered by an expensive imagesetter. And whether you're talking Iris inkjets or four-colour separated film, once you cross the electronic divide and enter the world of physical things, mistakes can be costly.

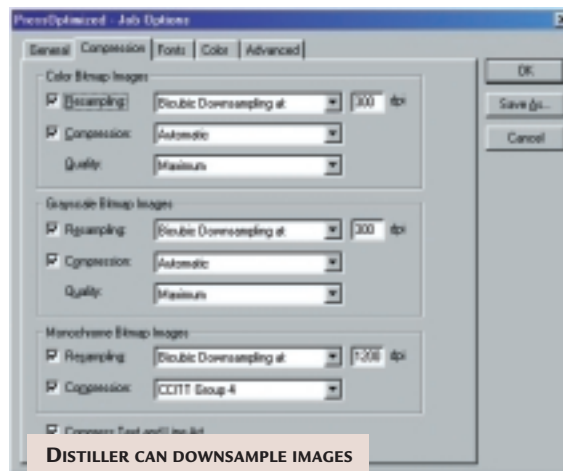
One way to get a sneak preview is, of course, to create PDF files using Acrobat Distiller. This not only offers a quick, cheap and convenient way to provide client proofs, it often highlights problems that preflighting may not pick up.

Adobe quickly recognised the potential of PDF as a prepress delivery mechanism and has made it one of the key components in PostScript Extreme, its prepress workflow management suite. The other components are PostScript 3 and PJTF (portable job ticket format), a companion standard to PDF.

As well as being able to proof your output onscreen, as a prepress delivery system PDF has several advantages over the 'collect for output' method. You need only one file, not hundreds, and that single file will, thanks to compression and downsampling, be much smaller than the sum of all the files (layout document, pictures, fonts) it consists of.

You don't have to rely on a bureau having the same applications, extensions and fonts as you, and they can perform trapping, separation and even file editing in the rip.

In PostScript Extreme, the PDF is the digital master that contains your document and its content – text,



DISTILLER CAN DOWNSAMPLE IMAGES TO A SUITABLE RESOLUTION FOR HIGH-END PRINTING

formatting, pictures and fonts. PJTF is used for processing that content. A job ticket, independent of the PDF, contains information about the state of the document and what needs to happen to it. This work is then done by Job Ticket Processors (JTPs). Once a JTP has finished, it updates the job ticket and the document passes on to the next stage.

The most important JTPs, written by Adobe, are the Sequencer, Co-ordinator, Normaliser and Printer. Other JTPs will be written by independent developers (PostScript Extreme is an open architecture) to provide bespoke functionality.

The Job Ticket acts as an audit trail and subsequent JTPs can act on information recorded by previous ones. It's also possible to make changes much later in the production process. For example, halftone screen and trapping information is contained within the job ticket. So, if a last-minute change of paper required these to be altered, you wouldn't need to go back and edit trap and screen specifications in QuarkXpress.

Other functions that would be handled by JTPs include colour management and imposition. Adobe calls this late binding.

You don't need to be involved in complex pre-press workflow

management to take advantage of a PDF-based approach to bureau output. Using Acrobat 4 to create composite PDF files for high-resolution output is straightforward enough.

The first thing to do is prepare your files for output and preflight them as usual. Next you need to print composite files. It's important to use the Adobe PostScript printer driver and Acrobat Distiller 4 PPD

which you can get from www.adobe.com/products/printerdrivers/windows.html#adobe43. The Distiller 4 PPD doesn't write device-specific information to the PostScript file, but does allow you to specify custom paper sizes.

Make sure you include all the fonts – unless they are in the PostScript file you won't be able to embed them in the PDF. If you're using QuarkXpress it's tempting to take a shortcut and save pages as EPS files, but this doesn't allow you to include the fonts, or specify the page size and other important parameters.

Next, you need to look at the predefined job option settings and decide whether you need to edit them. Distiller 4 provides three settings – press, print and screen-optimised. The press-optimised settings are designed to maintain all the high-end information required for commercial printing. You can review these by selecting PressOptimized from the job options pop-up menu, then choosing settings/job options (CTRL & J).

The job options dialog box has five tabs – General, Compression, Fonts, Colour and Advanced. When producing PDFs for screen viewing, the downsampling and compression options are set to produce the smallest possible file sizes, a case of never mind the quality, feel the width. For press output, the reverse is true, but it's still possible to save some space.

If you set downsampling to 300dpi

Questions & answers

Q I have just bought a photo-quality printer and one of the things I am looking to do is to scan in holiday snaps and print them off.

Could you tell me which is the best format (TIFF, BITMAP, JPEG, etc) to use to save the scanned image as, in order to produce

the highest-quality prints.

ANDY GUEST

A Scan them so that, at the output size the resolution is 150dpi, then save them as JPEG files with medium compression if your package offers a choice. This will provide good-quality prints and keep the file sizes reasonably small, so large collections of photos won't eat into your hard drive space. When you print, you'll

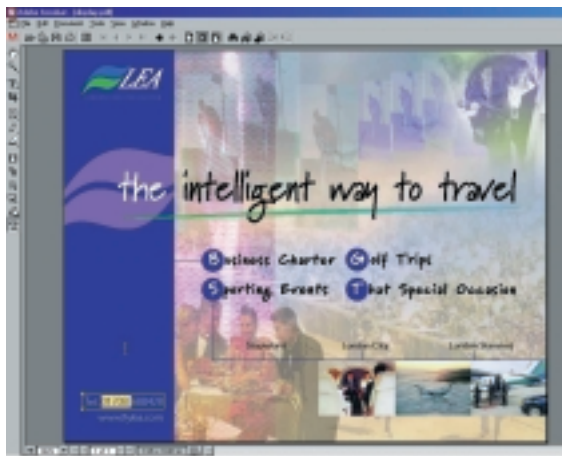
probably get best results if you turn off colour management or photo-enhance features in the print dialog box.

Q All of a sudden, my copy of Photoshop refuses to start. It gets as far as the startup screen, then freezes. I've tried reinstalling it, but to no avail. Help!

MARTIN BABCOCK

A It sounds as if your preferences file is corrupted.

If you find and delete it Photoshop will create a new one on startup. With Photoshop 5, Adobe split the preferences file into three – Adobe Photoshop 5 prefs.psp is probably the one causing the problem. If the other two, Colour Settings.psp and Actions Palette.psp, are OK, although you will need to put your general preferences back the way they were, you will still retain any colour settings and actions you previously set up.



MAKING LAST-MINUTE EDITS TO THE PDF IN ADOBE ACROBAT 4

The font-embedding tab lets you embed fonts and avoid the unsightly appearance of courier, unless, of course, you intended it to be there. The safest thing to do here is embed all fonts and select Cancel Job when embedding fails.

If you choose to

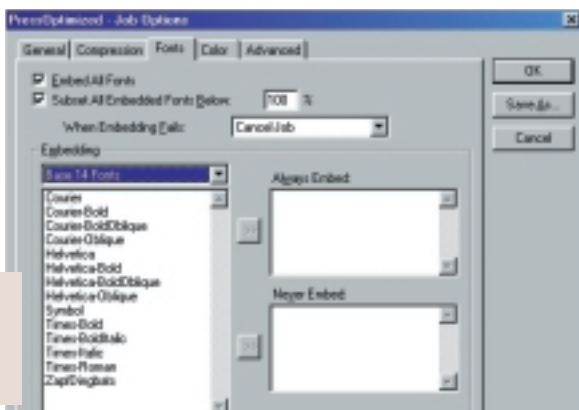
subset embedded fonts, Distiller will only include those characters present in your document. This will reduce the file size, but also your chances of making last-minute corrections if the required glyphs aren't present.

Acrobat 4 ensures that your own fonts and font metrics are used by creating a custom name, so there's no danger of text reflowing or other funny business as a result of your bureau using a different version of the same font.

(good enough for 150-line halftone screen output) then Distiller will downsample images that are more than one-and-a-half times that resolution.

For example, it often happens that you intend to use an image full-size on the cover, but later relegate it to a column on the back page. You place the original scan and reduce it, say to 25 per cent in your layout application. Distiller would downsample this image to 300dpi at the printed size, saving on file size with no loss in quality.

Finally, make sure you check the compressed text and linearise options in the Distiller user interface – Distiller uses lossless compression for these elements, so again there will be no reduction in quality.



FOR PRESS OUTPUT YOU NEED TO EMBED ALL FONTS AND SET THE JOB TO CANCEL IF THIS FAILS

There are problematic issues when using composite PDFs as the basis for process colour separated output. First, if your bureau uses a PostScript Level 2 rip, duotone EPS files won't separate correctly.

To take full advantage of PostScript Extreme the answer is to find a bureau that uses PostScript 3 rips, although you will need to be using Photoshop 5.0.2 for your duotones to separate correctly. Colourised tiffs and spot-to-spot colour gradients also may not separate properly.

DCS files pre-separate images into their component process colour plates and add a composite preview file. They're favoured by many service bureaux as they can provide studios with preview files and keep pre-separated files to be matched up by the OPI server at output.

They are also quicker to rip than composite EPS files. However, they won't work in a composite PostScript file – only the preview is printed to the black plate.

An option for Quark users is SmartXT from Total Integration at www.totalint.com/8.98.html, which recombines DCS files into a single file when creating a composite PostScript file. If you're opting for a composite PDF workflow, in the absence of other strong reasons for sticking with DCS, it would seem sensible to abandon it in favour of single-file EPS.

There's more information on PostScript Extreme and Preparing PDFs for high-resolution printing is at www.adobe.com/print/technologies.html.

PCW CONTACTS

Ken McMahon welcomes your feedback on the Graphics & DTP column. Contact him via the PCW editorial office, or email graphics@pcw.co.uk



In a world of your own

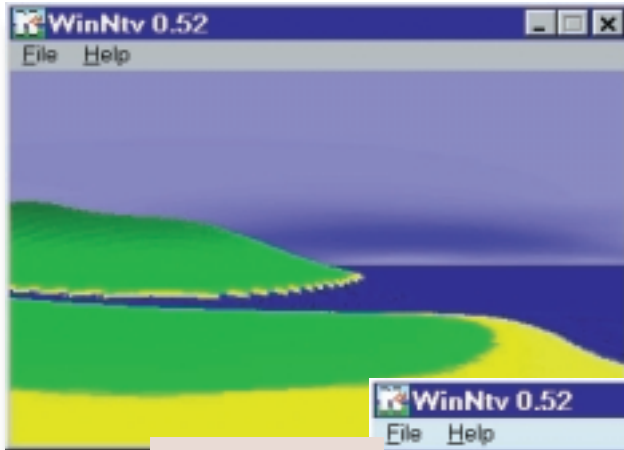
Benjamin Woolley marvels at the 'instant-world' landscaping engines currently in development.

It is unusual for a software developer to complain about the amount of publicity they are getting, but that was the impression given by Tom Barbalet, an Australian programmer.

He has developed a 'large-scale, natural landscaping engine' called Psi, and it has caused quite a stir. The US writer Douglas Rushkoff mentioned it in a column, and Barbalet's server (www.nervana.com) was swamped. 'I was not ready for this kind of publicity!' he protested.

The cause of the kerfuffle was a series of algorithms Barbalet developed in his spare time, and with the support of (unlikely though it may seem) the Australian Film Commission. This 'engine' could generate rendered land and skies in real time. He promoted the results of his efforts by distributing a CD with a game that used the engine to create a virtual reality island.

Recently, Barbalet also posted a little demo version of the engine on his



A LANDSCAPE GENERATED IN REAL TIME BY THE PSI LANDSCAPE ENGINE. YOU NAVIGATE AROUND THE ISLAND USING THE MOUSE

website, which produces a crude fly-by of a simple island landscape (see screenshots above). The resolution is low and looks crude, but the entire package – engine and landscape data – is an 80KB file, and it shifts like lightning, with the clouds skimming across the sky at the speed of time-lapse photography.

Work is still at a preliminary stage, but it will be well worth keeping an eye on future

EXAMPLES OF WHAT CAN BE CREATED USING GENESIS II. THE VEGETATION IS PARTICULARLY REALISTIC



postings to Barbalet's site, just as long as he can cope with the pressure.

Meanwhile, you can try out an altogether different kind of landscaping package called Genesis II from Geomantics (www.geomantics.com). My namesake Kevin Woolley, who works at Geomantics, invited me to have a look at it, and I'm glad



he did. The interface (screenshot on the opposite page) is not very elegant – indeed, ugly compared to its nearest rival, Bryce from Metacreatations. It took me a day or two to get a grasp of it, but once I had, I found the package to be very powerful and good fun. Some of the examples of its output (below) show exactly how powerful.

Bryce and Genesis II both use a fractal generator to build their landscapes. But in other respects they are very different.

With Genesis, you clothe your landscape with what is called a 'terrain'. Among the types of terrain supported are vegetation and urban.

If you create a vegetation terrain, then you can select a series of plant types (examples included in the package are oaks and bushes), which will then be laid over a specified area of the landscape.

If you create an urban terrain, then you can specify a 'height' map (an image that determines the height and shape of the buildings),

Questions & answers

Q I produce animations in a 3D package and render them out to the AVI file format. I have spent the past 18 months learning the program. Now, however, I want to go one stage further and transfer my AVIs to video tape, but there seems to be a general lack of any written information.

My first problem, though, is after my AVIs are finished and rendered – when I play them back full-screen on my 17in monitor the picture is slightly jumpy. Does this mean that my computer setup is not powerful enough to play back full-screen video without the judder, and would a simple upgrade cure this problem? My computer setup is 266MHz Pentium II, 96MB SDRAM, a Diamond Fire GL 1000 PRO graphics card, and 10GB ATA 33 hard drive.

RICHARD HOARE

A Your question is representative of several emails I received following my columns in July, August and September 1999 concerning video.
 Your diagnosis of the

problem is probably correct, but there are a few things you can try before shelling out for a replacement system. First, if your animations are intended for video, make sure you render them to PAL resolution, ie 720 x 576. Larger resolutions produce larger files and slower playback. Also, make sure that the AVI (or QuickTime) file is stored on a defragmented hard disk.

If this doesn't do the trick, experiment with different CODECs (compression/decompression methods), and adjust the parameters. Generally speaking, if the bottleneck on your system is the hard disk or system bus, use higher compression (smaller file, but demanding more processing power to be decompressed); if it is processor speed, use lower compression (bigger file, less stress on the processor).

One additional and very important tip is to check you are using the latest driver for your graphics card. Visit the card vendor's website (in your case www.diamondmm.com; the latest version is 4.10.01.2359 and was posted 11/4/98).

Another option, mentioned previously in this column, is to use digital video (DV), which is a different format to (analog) VHS. Through an IEEE1394 (Apple calls it 'FireWire', Sony i.LINK) interface, the barrier

between computer and tape becomes much more transparent. The latest versions of video-editing software, such as MGI Videowave II and Adobe Premiere 5 include built-in support for DV recorders. For example, on Videowave II, you can actually control the recording and playback of some DV camcorders through the software (note, however, that some camcorders do not support video-in, ie can't record from a FireWire interface, at least not without modification).

However, if you standardise on DV, you will obviously need to copy your finished DV tape to a VHS machine using tape-to-tape transfer, if you want other people to view your work. You will inevitably lose quality when you make this transfer.

If you do decide to go the whole hog and get a new system, make sure it has a large SCSI hard disk that you can devote to storing captured video.

There is a helpful site on digital video at desktopvideo.about.com/compute/multimedia/desktopvideo. A good UK site, run by a reseller of DV cards, is www.datavision.co.uk.

Q I'm very strong on the technical side of 3D graphics, but I've never had a go at the artistic and

cinematic side. I've read all your old columns, so I'd appreciate any pointers as to where I should go to learn more about this area. I suppose the best way I might describe it, is what emotive techniques should you bring to 3D animation?

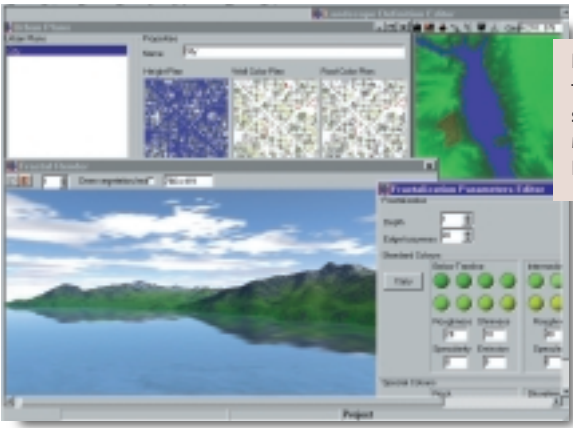
BRUNO BOWDEN

A By learning about the 'cinematic' side, I assume you mean learning about structuring a narrative, building tension and so on.

Unfortunately, I know of very little that covers this area (and I would welcome suggestions from readers). There are several books aimed at wannabe directors and scriptwriters of conventional, live-action films, but I doubt these would be of much use.

The only book I have read relating to computer animation and not tied to one package is 3D Graphics & Animation: From Starting Up to Standing Out by Mark Giamburro (New Riders, £41.99, ISBN: 1562056980). This has ideas in a section devoted to putting together a show reel.

You could subscribe to a specialist magazine – in addition to PCW, of course – such as 3D Artist (published in America, although there is limited availability here, or order copies at www.3dartist.com).



NOT PRETTY BUT EFFECTIVE – THE INTERFACE FOR GENESIS II, SHOWING THE VARIOUS MODULES, SUCH AS THE 'URBAN EDITOR', USED TO ADD TERRAINS

and a roof and wall map to texture them. The resulting city will then be 'built' over the landscape's contours.

However, the best thing of all about Genesis II is

that there is a functional version available as freeware from the company website (the main restriction being that you can only add one terrain to each landscape). It is a fairly hefty 4MB file, but well worth every second of the download.

PCW CONTACTS

Benjamin Woolley welcomes your comments on the 3D Graphics column. Contact him via the PCW editorial office or email 3d@pcw.co.uk



Making first base

Tim Anderson takes a look at MSDE, Microsoft's client/server database engine that is free to deploy.

Most real-world applications use databases, so a key decision early in the life of a project is which database to use. At one extreme you can roll your own using low-level file manipulation, and at the other you might want to connect to a mainframe.

Small systems built with Visual Basic tend to use JET, the database engine of Microsoft Access, and the parallel choice for Delphi is usually Paradox. Both are excellent database engines, and for developers wanting to deploy applications they have the huge advantage of being free to distribute.

Since the arrival of Office 2000, Microsoft has offered another option. The Microsoft Database Engine (MSDE) is also freely distributable by licensed users of Office Developer Edition or Visual Studio 6.0.

By contrast, similar products from Inprise (Interbase) and Sybase (SQL Anywhere and its derivatives) do require licences, so this is a good deal. MSDE itself is really SQL Server with a few restrictions, but the full SQL Server is expensive to deploy.

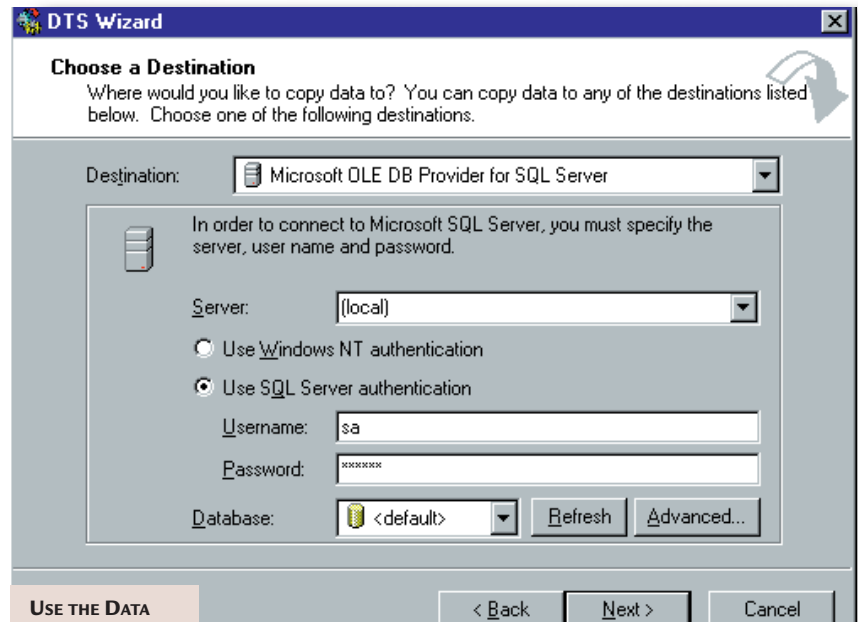
But why move from comfortable old JET to the unknown territory of MSDE?

Well, there are several reasons. First, JET works through file-sharing while

MSDE is client/server. It is important to be clear about the difference.

Imagine a network with two workstations and a shared Access database. To connect to the data, each workstation loads its own independent copy of JET into memory and opens the database file across the network.

File-sharing database engines are only suitable for small numbers of users



USE THE DATA TRANSFORMATION SERVICES WIZARD TO IMPORT DATA TO MSDE

JET might not even be installed on the server where the data is located.

This makes it difficult to prevent large amounts of network traffic, as the database file is read by the application. It also means that because each instance of JET runs in isolation, it is difficult to optimise performance when there is multi-user activity.

Finally, the integrity of the data depends on the proper refreshing of the database file as seen by the application, when its contents change because of other network users writing and deleting data.

This last point is particularly aimed at NT users. A common problem is database corruption caused by over-enthusiastic caching of data on the server, when there is heavy activity from several users of the same file. Novell is reportedly much better in this respect, although NT can be tuned to prevent most problems.

The bottom line is that file-sharing database engines are only suitable for

small numbers of users. For JET, Microsoft suggests a maximum of 20, and fewer than that if the system is to be used intensively. There is a built-in limit of 255.

In contrast, MSDE is a client/server database. The database file is only accessed by one instance of the database engine, running on the server. Small client libraries run on each workstation, to handle the connection to the database engine.

MSDE does all the processing of queries and updates on the server, and feeds back results to the clients. The system is inherently more suitable for multiple users, partly because network traffic is less, and partly because MSDE can be smart about handling multiple connections.

The full SQL Server has no specific limit on the number of concurrent users, and if performance is a problem it is easy to upgrade the server. MSDE has additional features that JET lacks, such as transaction logging, which lets you backtrack and recover the database as it was at a previous moment in time.

■ Should you use MSDE?

There are a couple of points against it. One is that it is larger, so if you are

deploying a single-user application the system requirements are greater. Another is that it is different and more complex, so experienced JET developers have some learning to do. Installation is also more difficult. Otherwise, the arguments in favour are compelling.

■ How to move to MSDE

Developers have to know more than how to simply read and write data. There is also the matter of how to design the database, create the tables, establish security and enforce relational integrity.

The full version of SQL Server comes with Enterprise Manager, but not with MSDE. The twist is that Visual Studio 6.0 comes with a developer version of SQL Server, so that you can use Enterprise Manager to manage databases, and then deploy them using MSDE.

The second twist is that Access 2000 can connect natively to MSDE and provides visual tools to manage the data. Note that MSDE is not installed by default. Find the SQL directory on the Office 2000 CD, and run SETUPSQL.EXE from the x86/setup directory.

If you have Visual Studio 6.0, you can download the setup package MSDEX86.EXE from Microsoft's website. This installs the database engine along with the service manager for starting and stopping it, but not much else.

It is not intended that you use this for development, but it is essential for deploying MSDE applications, and comes with an installation script that you can modify. It works on Windows 95, 98 and NT.

The service manager is an important clue as to how MSDE actually works. A service is an application that runs in the background. On Windows NT you can set a service to run even when no user has logged onto the machine. The service has to be running for you to access the data.

To add a database to MSDE, the data has to be created or imported under the control of a specific MSDE installation. In other words, you cannot simply copy a database file into a directory – it has to go through the database engine.

This makes deploying an application a little trickier, but has the advantage that you do not need to worry where the data is stored.

All that you really need to know is which MSDE server is actually managing the database that you want to access.

■ Getting started

Once you have installed either MSDE for Office 2000 or some other version of SQL Server 7.0, you can create a database. One easy way is to use Data Transformation Services (DTS) to import an existing Access (or other) database.

The Office 2000 installation provides an Import and Export (DTS) wizard that turns up in the MSDE group on the Start menu, putting a friendly face on DTS. There is also an Upsizing Wizard in Access, which is more fully automated

but gives less control.

Note that with SQL Server you will always be asked for a user name and password, which by default is 'sa' with a blank password, unless you are running Windows NT and using integrated authentication.

It is worth exploring the DTS wizard, as it offers a wide range of options. For example, you might want to change a column (field) name, or amend the wizard's decision about the correct SQL Server field type for a particular field.

Normally, you will also want to change the database destination from 'default' to 'new', unless you really want to add tables to an existing database.

A few points to consider are that character field types come in Standard and Unicode types, the latter shown by an initial 'n' in the type name, as in char and nchar. The wizard defaults to Unicode types, but these take up twice as much space and could be an unnecessary indulgence if you do not need the extra characters.

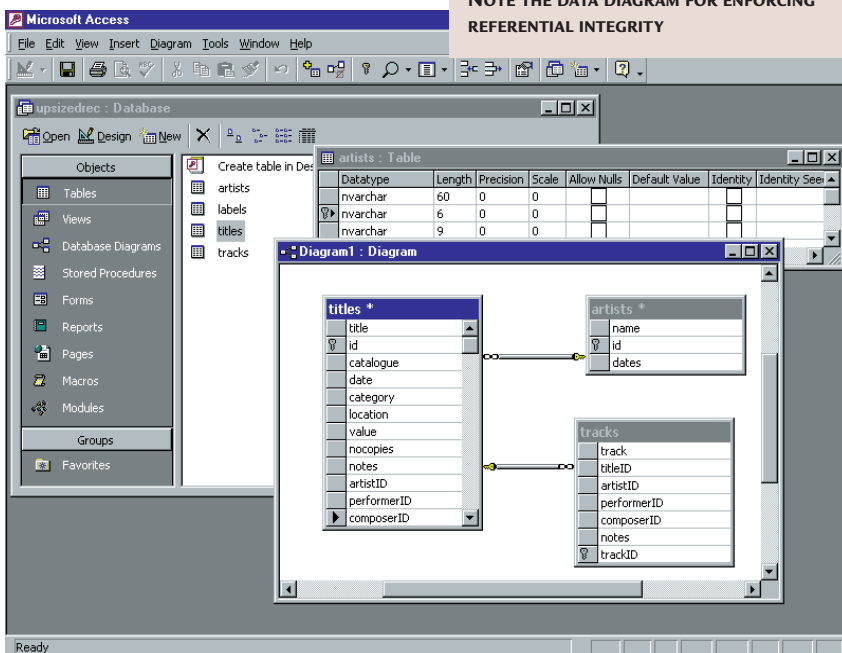
Next, note that some fields are prefixed 'var', which means variable length. This affects the way the data is stored, with fixed-length fields being better for performance but variable length making better use of space.

If you import a database, you should take a careful look at the results. You can do this with either Access 2000, by creating a Data Project based on the new database, or by using SQL Server Enterprise Manager if you have SQL Server 7.0.

Depending on the method used (DTS, Upsizing wizard) and the options

The service manager is an important clue as to how MSDE actually works

IN ACCESS 2000, USING MSDE IS JUST A MATTER OF CREATING A DATA PROJECT. NOTE THE DATA DIAGRAM FOR ENFORCING REFERENTIAL INTEGRITY





(FIG 1)

VBA routine to show a dialog from a contact form

```

Sub showdialog()
Dim thisitem as ContactItem
If TypeName(Application.ActiveInspector.CurrentItem) <> "ContactItem" Then
Exit Sub
End If
Set thisitem = Application.ActiveInspector.CurrentItem
' ... use reference to Contact to set values in the dialog and save changes
UserForm1.Show vbModal
Exit Sub

```

chosen, you may still have considerable work to do. Check that there is a primary key defined for each table, otherwise the database will not work properly. You should also check other indexes and referential integrity rules, since some import procedures carry these over imperfectly or not at all.

If you use AutoNumber fields, check that these have translated to SQL Server Identity columns. Another point to check is whether you want to allow null values in each field. Needless to say, it would be unwise to take a business-critical application, upsize the data to MSDE and run live against the new database immediately.

■ Using MSDE

Once you have an MSDE database up and running, you can start building applications that use the data. SQL Server has been around for some years and there are several ways to control it via programming.

An Access 2000 data project lets you work with MSDE

Mysteriously, Microsoft states that MSDE is tuned for use by five or fewer users

much as if it were JET, the most significant difference being that whereas a JET MDB generally contains the data itself, a data project only stores forms, code and other application elements.

To get at the data from Visual Basic, Delphi or other languages, the most common route is ODBC, Microsoft's older universal database API, or ADO, the newer COM-based equivalent.

The ODBC drivers for SQL Server usually work well, so do not be put off by bad experiences with drivers for Microsoft Access, Visual FoxPro, or other desktop drivers.

If you have Visual Basic 6.0, Visual InterDev or a compatible version of Delphi 5.0, ADO is usually a better choice.

Here are three tips for getting started with SQL Server programming.

First, whatever API you use, you need to learn Transact SQL, the SQL Server variant of Structured Query Language. There are differences, although Microsoft has published a list of these and has been trying to reduce them.

Second, to get the best from SQL Server you need to use stored procedures, which are SQL scripts that are compiled and stored with the database. Stored procedures can take parameters. Most Access queries, particularly those that take parameters, should be converted to stored procedures.

Third, consider adding timestamp fields to SQL Server tables. These fields speed up some internal processes and also make it easy to do optimistic locking. The

timestamp indicates when the record last changed, so you can use it to detect if one user has updated the data while another user had the same record open for editing.

Microsoft has taken a few steps to protect sales of SQL Server licences. Individual databases are limited to 2GB. MSDE does not support transactions across several SQL Servers.

Replication with an SQL Server database requires a licence. More mysteriously, Microsoft states that MSDE is tuned for use by five or fewer concurrent users, although this is not a

licensing restriction.

How much performance deteriorates after that point is unclear – if you have tried it out, please send an email explaining just how it went.

Overall, the restrictions are reasonable and

MSDE is a great deal for Windows developers. There is a lot more to learn, but try not to be put off from making a start.

■ VB and Outlook

Alan Lhermette wrote in to ask how he could customise dialog boxes generated by clicking on the Full Name command button in a standard contact form. Despite reading a number of books on Outlook, VBA and VBScript he still can't seem to find the answer.

Outlook 2000 comes with two programming languages. The application itself includes VBA, just like the other Office applications, but VBA is not supported in Outlook forms. Forms only support VBScript.

There is no VBScript dialog editor, so on the face of it you are limited to InputBox, which throws up a single edit box. There are a couple of ways around this.

First, you can use one of the spare tabs on the contact form instead, although this is not quite a dialog.

Second, you can design the dialog in VBA and call it from VBScript. Open the VBA editor, insert a UserForm, and design the dialog there.

Next, create a sub-routine without any parameters that displays the UserForm modally.

Fig 1 shows an example. Now you can call the dialog from VBScript in a contact form, as `Application.showdialog`.

PCW CONTACTS

Tim Anderson welcomes your Visual Programming comments and queries. Contact him at visual@pcw.co.uk or via the PCW editorial office.

For more information about MSDE, see <http://msdn.microsoft.com/vstudio/msde/techfaq.asp>

Gift of the gab

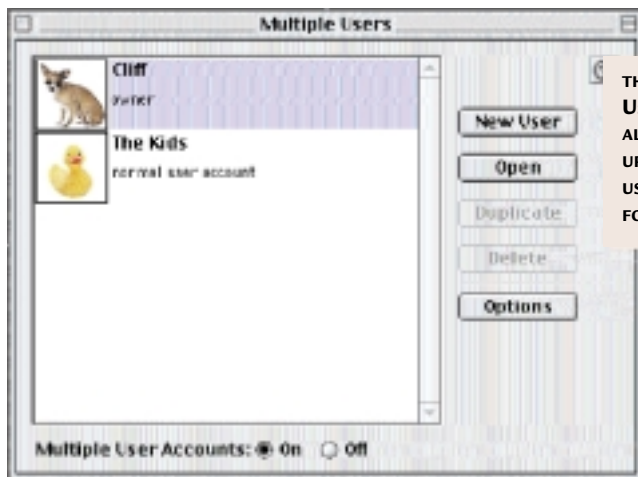
Cliff Joseph gets all excited at the prospect of **telling his computer** what to do using MacOS 9.

Apple's been very cagey with review copies of OS 9, so we haven't been able to take a close look at it until now. However, this is a fairly major upgrade for the MacOS and includes a lot of interesting new features, so it's still worth catching up on even if it's a little later than we would have liked.

There's been plenty of coverage for Internet-oriented features such as Sherlock 2 and the new QuickTime Player so we won't repeat what's been written elsewhere. Instead, I want to take a look at some of the features that have received less attention.

If you're one of the two-million-plus people who have bought iMacs for use at home, you'll be interested in the ability to create multiple user 'accounts' on your machine. You can create accounts for up to 40 separate users, and you can specify the way each person is allowed to use the machine. So if you've got kids and you don't want them surfing the Internet while you're not there to supervise them, you can create an account that will prevent them from launching

I like the ability to use a voiceprint – rather than a typed – password in OS 9



THE NEW MULTIPLE USERS CONTROL PANEL ALLOWS YOU TO CREATE UP TO 40 SEPARATE USER ACCOUNTS FOR YOUR MAC

levels of access you can assign to the various user accounts you create. Normal Access allows you to see the Mac desktop and the

applications such as web browsers.

If you look at the new Multiple Users control panel, you'll see there is already an account set up that specifies you as the owner of the machine. As the owner, you have full access to the entire Mac system and can configure accounts for all other users.

contents of the hard disk as normal, and merely prevents the user from opening the 'documents' folders that belong to other users.

The Limited Access option also allows the user to see the Mac desktop as normal, but will only allow them to open programs that you specify.

The final option is called Panels, and this changes the entire appearance of the Mac desktop, splitting it into a series of panels that display only the applications and documents you want the user to see.

When creating Limited Access or Panels accounts, you use the Edit dialog box to specify the user's access privileges. The dialog box includes a list of all the applications on your hard disk, and you simply click on a button to allow or disallow use of specific programs. You can also prevent people from using your printer, CD-ROM or DVD-ROM drive. These are useful options for people with children, as they can prevent them from accidentally printing out a million pages of rubbish or being able to watch DVD titles that are unsuitable for youngsters.

Another feature I really like is the ability to use a voiceprint – rather than a typed – password to gain access to your Mac. The Multiple Users control panel includes an option called Voice

The first thing to do is to activate the Multiple User Accounts option shown at the bottom of the screen. You can then create new user accounts and specify a password for each account. Each new account gets its own Documents folder on the Mac desktop, where the user can store personal files and documents. You don't have to use this if you don't want to, but access to this folder is denied to other users of the machine, so it

provides a reasonable level of security for your personal files.

There are then three



YOU CAN SPECIFY THE APPLICATIONS THAT EACH USER ACCOUNT HAS ACCESS TO, SIMPLY BY SELECTING THEM FROM A LIST



Verification, which allows you to record a spoken password. You'll need a microphone connected to your Mac of course, but these days all Macs are sold with this peripheral included – with the exception of the new iBook – so this isn't a problem for most people.

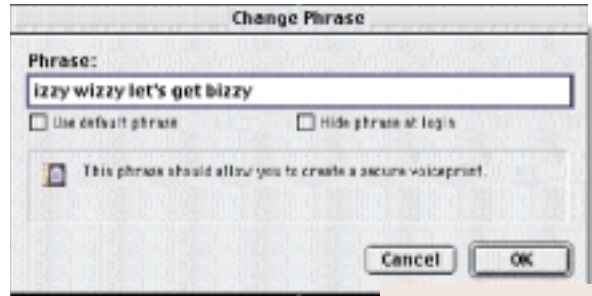
When you select Voice Verification, you will be asked whether you want to use the default password (which is 'my voice is my password'), or create a new password. You type the new password in first and then you will be asked to speak the password into your microphone four times.

Your password won't sound exactly the same each time you say it, as all sorts of things can affect your tone of voice during the course of the day. Repeating the password four times therefore gives the software some idea of the variations in your voice that it may have to deal with.

Voice recognition technology is still pretty crude, but we found the voiceprint feature worked very reliably, and if all else fails you can fall back on your original typed password to log in to your Mac.

It's a pity that this method of processing voice commands is only available when specifying a voice-password. The MacOS has included voice commands for a couple of years, but they're not widely used,

simply because voice-recognition is still not reliable enough for everyday use.



VOICEPRINT RECOGNITION ALLOWS YOU TO USE A SPOKEN PASSWORD TO GAIN ACCESS TO YOUR MAC

If you look at the main Apple menu you'll see a folder called Speakable Items. In OS 9, this folder includes a new set of voice commands, for controlling specific applications such as web browsers or for altering settings such as your desktop wallpaper.

The Star Trek computer that understands your every word is still a long way off

We've covered the Mac's voice-recognition features in this column before, so we liked the idea of new voice commands that would allow us to control a web browser. However, to be honest, they didn't work terribly well.

So don't throw your keyboard away just yet, because that *Star Trek* computer that can understand your every spoken word and command is still quite a long way off.

I'm afraid this is the last dedicated Mac column in *PCW*, but don't worry as the magazine will continue to cover Mac products in the reviews section and issues relating to Mac users in feature articles.

In parting I'd like to thank those Mac enthusiasts who wrote in over the years and gave life to this column.

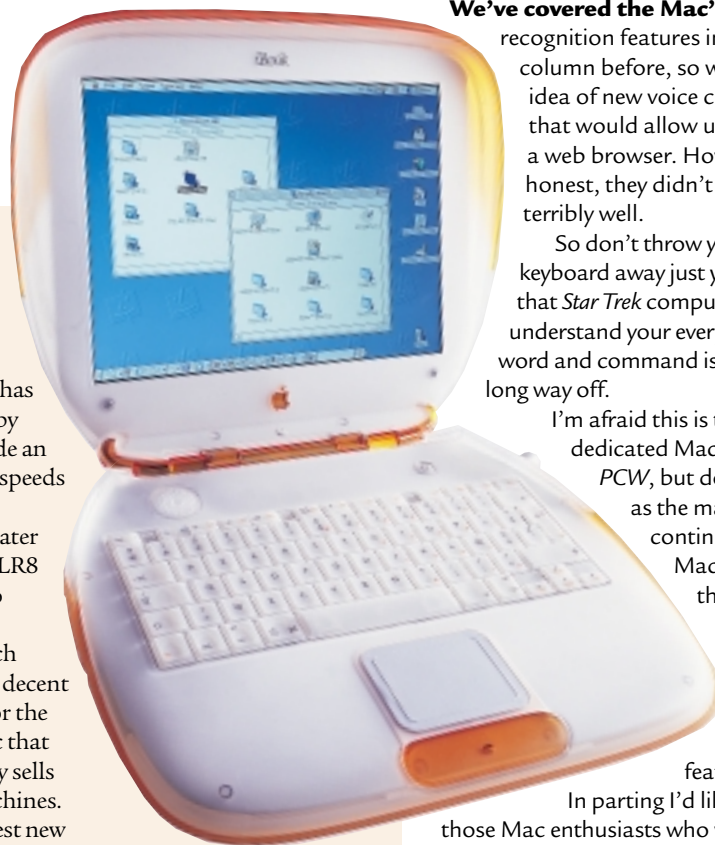
It's not all talk

Most of this month's column focuses on new software features in the MacOS, but there are some interesting hardware products scheduled for release by Apple over the next couple of months.

We're particularly intrigued by the G4 upgrade cards, coming from companies such as XLR8. It was thought there were technical problems which prevented the 350MHz and 400MHz G4 Macs from being upgraded to use the new G4 processor. However, it seems that XLR8 and one or two other companies have sorted these problems out and are about to release the

first G4 upgrades. The company even has an offer whereby you can upgrade an old Mac to G3 speeds now and get a discount on a later G4 upgrade. XLR8 is also about to release a USB keyboard, which should make a decent replacement for the lump of plastic that Apple currently sells with all its machines.

But the coolest new product to hit the Mac scene comes from Apple itself. The Airport base station unit provides wireless networking to all new Macs, iMacs and iBooks. It has just been approved for use in the



UK by British Telecom. Apple has set a UK price of about £230 for the base station, which brings wireless networking right down to mass-market price levels.

PCW CONTACTS

Although this is the last Mac column, you can contact Cliff Joseph for the remainder of the month at the PCW editorial office or email mac@pcw.co.uk

Configure it out

Bob Walder takes us on a **step-by-step guide** to getting your PCs talking to each other.

We have covered some pretty advanced stuff in the past couple of months, but the majority of email queries I receive still dwell on one important topic – how to get two computers talking using Windows 98 and a pair of network cards. I will refer you to previous columns where we discussed the various cabling options available, rather than go into it all again here in detail. Just to recap, however, you have three options depending on which type of Ethernet card you have in your PC:

➔ **10-Base2/Thin Ethernet** – You need a length of co-axial cable, two T-pieces and two terminators. Put a T-piece and terminator on the connector on the back of each card, and connect the cable between them. More PCs can be added by breaking the chain and inserting a new cable and T-piece. The terminators should be at each end of the cable run.

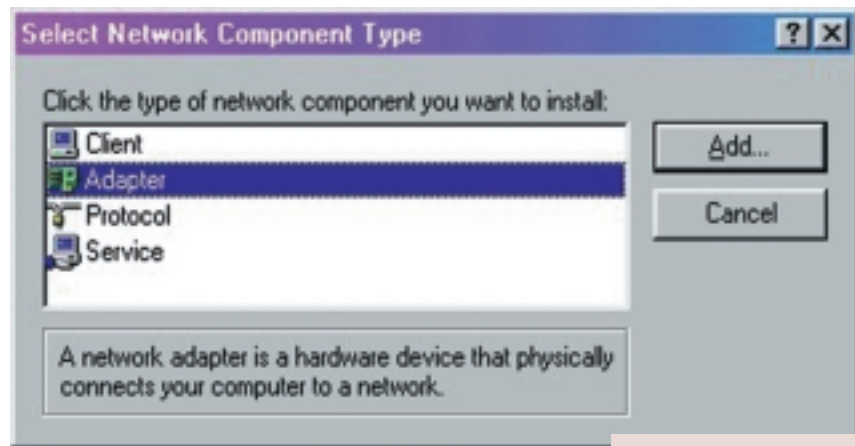
➔ **10-BaseT and a hub** – You need two pieces of UTP cable (Category 5 preferably) to connect each PC to a spare port on the hub. More PCs can be added by attaching new ones to the hub.

➔ **10-BaseT with no hub** – You need one UTP crossover cable, which connects the two Ethernet cards together directly. No hub is required, but your ‘network’ is limited to two PCs.

OK, so that’s the cabling bit out the way. Next we need to make sure you have everything configured correctly. The first thing you might want to do if you have tried and failed is remove the network card from your Control Panel Network settings (just to allow you to start from scratch), and restart your machine. Once your machine has re-booted:

1 Click on the Network icon in the Control Panel again, and on the Configuration tab, click the Add button.

2 In the Select Network Component Type dialog box, double-click the



YOU HAVE TO CHOOSE FROM THE LIST OF NETWORK COMPONENTS

type of component to install, as described in the screenshot above. We are going to begin by adding our Adaptor.

3 A two-pane window will then appear with a list of manufacturers on the left, and a list of the network card drivers on the right. Select the appropriate manufacturer, then select the appropriate network card, and then click OK.

If, however, you have a driver disk which was supplied with your network card, you are better off using those drivers. In this case, you will click on the ‘Have Disk’ button, and browse the floppy disk looking in the root or WIN98/WIN95 (or however it happens to be named) directory for a file with the extension .inf. Highlight this file, then click on OK and you will be presented with a list of all the network card drivers that are on the disk.

4 When you are returned to the Configuration screen, you should see the Ethernet card, Client for Microsoft Networks, and IPX/SPX Compatible Protocol components. The Primary Network Logon should be the Client for Microsoft Networks.

5 On the Configuration screen, select the Client for Microsoft Networks and click on Properties. Ensure that the box Log On To Windows NT Domain is not checked, then check the Quick Logon box and click OK.

6 Select your Ethernet adaptor and click on Properties. In the Driver Type tab, ensure you are using the Enhanced Mode NDIS Driver. The Bindings tab should show a check box next to the IPX/SPX Compatible Protocol. You can ignore the Advanced tab for now, but the settings on the Resources tab should be changed (if necessary) to match those on your Ethernet card. This tends to be the trickiest bit of the whole procedure, since every network card is different. Some require you to set jumpers or DIP switches on the card, some allow you to make the changes in software, and some are fully plug-and-play. Whatever sort of card you have, you must determine what hardware settings are used (interrupt and I/O address range, for example) and ensure that the settings on this screen match what you have on the card. Your life will made be so much simpler if you have a machine with a plug-and-play BIOS and you buy a plug-and-play NIC to go with it – that makes everything just about as automatic as you can get it. Then click OK.

7 Presumably, you want to share disks and printers between your networked PCs, so click the File and Printer Sharing button, and check applicable boxes (if you are not sure check both). Click on OK, and you will see the File and Printer Sharing for Microsoft Networks entry on your Configuration screen.



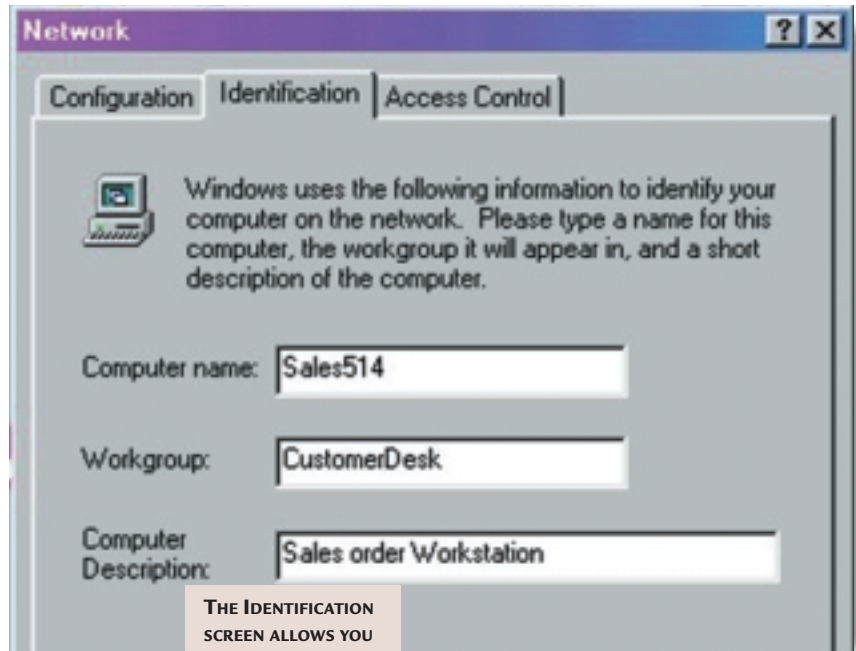
8 The network components are now all configured, so you can move on to the Identification tab (see screenshot, right). Windows 9x requires that you define a workgroup and computer name for each networked computer, independently of the type of networking software that you use. First, you give your computer its name. Keep it simple and not more than 15 characters and make sure that every computer on your network has a unique name – this is very important.

9 The default Workgroup name is WORKGROUP. You can leave this as it is if you are creating a network from scratch, but if you change it, you must ensure this is identical on every PC on your network. For those of you that are adding a Windows 9x client to an existing network, this should be the same as existing PCs.

10 The description field is purely for information – so do with it as you will. However, this field is displayed as a comment next to the computer name when users are browsing the network, so it might be helpful to put something descriptive in here, such as ‘Bob’s Computer in Accounts’.

11 Finally, go to the Access Control tab and ensure the Share-Level Access Control box is checked.

12 The configuration is now complete, so click on OK. You will be prompted for many disks or your Windows 9x CD-ROM at this point, following which you will then be



THE IDENTIFICATION SCREEN ALLOWS YOU TO NAME EACH NETWORKED COMPUTER

asked to reboot your machine.

13 When it comes back up, you should be asked for a user name and password, and if creating your network from scratch, you can make these up (but whatever you do, please try and remember them!).

14 You should be able to browse the network using the Network Neighbourhood icon, and the workgroup you created should be visible, as should all Windows 9x clients in the same workgroup as your own PC.

15 We are almost there now. Even though you can see the other

machines in your workgroup, you will not be able to do much with any of them until you have created some shares. Bring up the My Computer window and right-click on the C: drive. If your networking is functioning correctly, there will be a Sharing option on the menu.

17 Select Sharing, and click in the Shared As box. The share name will default to C, and you can leave it as this or give it a more descriptive name such as ‘BOBDATA’.

18 Under Access Type, check the Full box. This is all that we need to do for now, since we are actually more interested in getting the network up and running than security to begin with. Next click on OK, and the icon for the C: drive will change to indicate that it has been shared.

19 Try to browse the drive from another PC in the same workgroup. If all goes well, you can repeat the process with other drives and printers throughout your workgroup.



A HUB ALLOWS YOU TO EASILY ADD EXTRA PCs TO YOUR NETWORK

PCW CONTACTS

Bob Walder is a journalist and networking consultant based in Bedfordshire. He can be contacted at the usual PCW address or by emailing: networks@pcw.co.uk

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HELPING HAND



Each month Anthony George, our customer services manager, will give advice on what to watch out for when buying computer equipment off-the-page.

The subtle difference between debtor-creditor and debtor-creditor-supplier agreements affects your legal rights when making a purchase.

↳ Debtor-creditor agreements

An agreement that does not directly involve any goods or services, such as one for a bank loan, is between the borrower and lender only. The lender is not responsible for any goods that are purchased as a result of the loan.

↳ Debtor-creditor-supplier agreements

If you borrow from a supplier of goods (eg under a hire purchase agreement) or from a company that has a business arrangement with the supplier (such as when making a credit card purchase) you enter into this type of agreement.

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when buying a printer, are all cables and cartridges bundled in? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

● BE CLEAR ABOUT SUPPORT AND WARRANTIES

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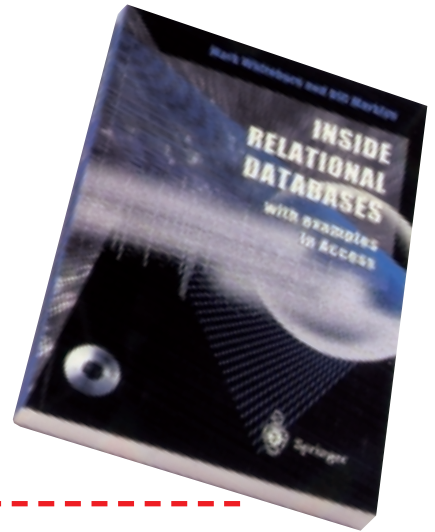
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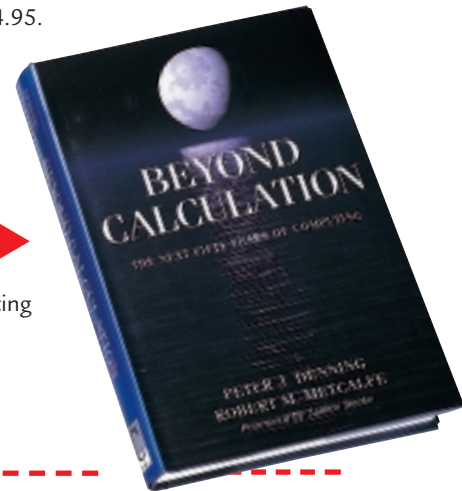
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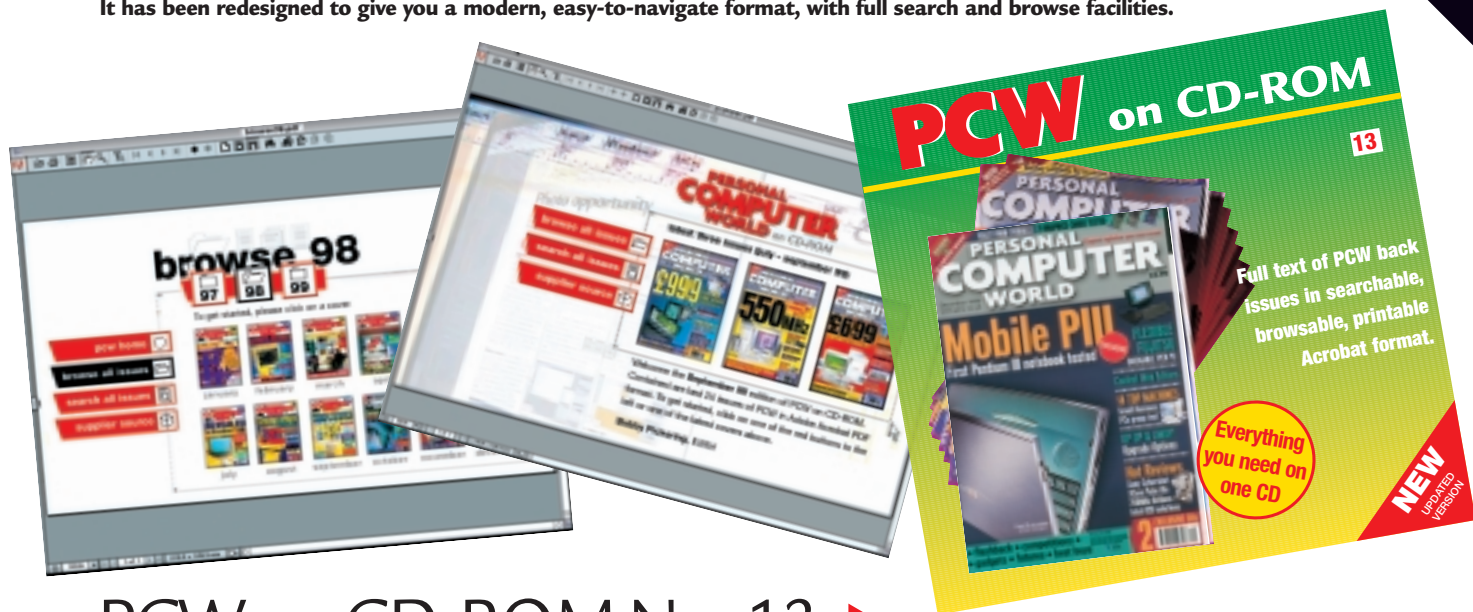
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Euro League Football

Back in the dim and distant past of PC gaming – 1992 to be precise – Spanish software developer Dinamic hit on a winner; football management simulations. PC Futbol, as it was known in Spain, was to prove a gold mine for Dinamic, selling over one million copies in eight years. Mega-developer Gremlin was so impressed it signed up the Spaniards to help produce its Premier Manager series, adding to the programmers' cachet and market for football management sims.

Now, having acquired some of Gremlin's best game designers to add to its own experience, Dinamic has decided to go it alone in the British market with Euro League Football. This time, however, it is a game of two halves, the reason being that Euro League Football goes one step further than other manager games by incorporating an element of arcade play to add to the plotting and scheming off the pitch.

The user interface in the management side looks to be as slick as a greased non-stick pan, with all the graphical bells and whistles we hoped for. As a management simulation, it's clear ELF will play second



fiddle to no-one. The detail is staggering – everything can be customised, from training players to building a multi-national team. It's even rumoured that real-life managers consult the Dinamic database for information on players, speaking of which, every league from every major footballing nation is here.

Should you want to, for the first time there is the choice to play a part on the pitch. The 3D engine for the interactive match mode looks excellent so far, but there is even more to come in the finished version. Get your tracksuits on and look out for Euro League Football in the shops.

www.dinamic.net

J MARK LYTLE

Fireteam

Fireteam, the new blockbuster from Cryo Interactive, will have real-time voice communication as a core part of the gameplay. Cryo claims it has developed technology that makes decent online voice messages possible. The possibilities are endless. Imagine playing a Special Forces sim and having realistic radio communications with squad members as you hunt the baddies, or using live chat to collaborate on puzzles in a 3D adventure.

Fireteam was released in the US a while ago, but problems with the technology have delayed the British release. Cryo assures us that things will be OK over here. As for the game itself, it's a standard one team against another affair, although the good stuff comes

when you plug in the audio gear. We found the headset impressive and noticed some excitement among the throng of gamers assembled to blow each other to bits. Graphics look functional, rather than exciting, and are shown from an isometric perspective. However, it was tactics and teamwork that mattered in the Fireteam world.

All the usual features of Internet games are here, including 'Team Deathmatch', 'Capture The Flag' and 'Base Tag'. Hardened gamers will know exactly what we're looking at here – it's about working together to survive or ganging up on some poor soul and knocking seven bells out of him or her. Best of all is the ranking system for the



hardest in the online community.

When Cryo took us along to try out an early version, we thought the voice communication through the dedicated US servers was impressive. One problem lay in not really knowing who was talking, but when it's this much fun, who cares? Fireteam UK is due for launch in January.

www.fireteam.com

J MARK LYTLE

Freespace 2

Sensory overload alert – with **glorious sound and colour**, this battle makes quite an impact.

One of the best games of 1998 was the original Conflict: Freespace. Borrowing all the best bits from space simulations to date, it impressed us in terms of its scope, and was one of the best games of all time.

Until now that is. There was no way that developers Volition could leave the grand opus alone and this fantastic sequel has all the makings of another classic game. Several decades after the Great War, the Terran/Vasudan alliance is still holding. But all is not well – you start in the middle of a bloody civil war. Admiral Bosh is fighting central command for control of the various systems and much of your time is devoted to seeing him off in

his quest for dominance. Meanwhile, the deadly Shivans arrive back on the scene and spend much of the game ramping up their forces for a full-scale invasion.

Volition has chosen to keep much of what made the original game so good exactly the same. You play an ace pilot who is shuttled between several crack units and deployed in the current hotspot of the moment. Each level follows a standard format: you are given a briefing aboard your command ship and are sent out to fulfil your mission objectives. The missions are extremely varied, with some requiring you to use your best dog-fighting skills to the full while, in others, you need to take a step back and command your troops from afar. Typically, you will have to race into a danger zone and take out a few enemy fighters before guiding one of your own battle cruisers in to destroy the enemy's massive ships.

Whereas the original Freespace tended to get a bit samey, this version includes a raft of new ideas to keep your interest. You get involved in testing new technology, go undercover to undermine your enemy's supply routes and fly a new



range of craft from bombers to nifty stealth fighters. Controls are complex, but there are training missions that introduce you to essential concepts such as subsystem targeting and energy management.

The graphics in this latest version are simply beyond belief. You need a 3D card to run this game and it's easy to see why – this is one of the first games we've seen that uses 32bit colour to its full effect. Several levels involve fighting inside a newly discovered nebular, and the colours inside are so incredibly vivid it's worth buying this just to gaze adoringly at them. It's fairly difficult to navigate inside the nebular, as the hazy gas combined with constant lightning flashes often obscure the screen completely, adding an innovative level of difficulty to some missions. You have to be much more careful to avoid friendly and enemy fire in Freespace 2.

The beam turrets seen in the final stages of the original reappear here right from the start. Each level is often an adrenaline-rush of beam turret fire, flak cannon shots and enemy ships whizzing

around you with one thing in mind: your annihilation. The noise all these ships generate is suitably disorientating, and combined with the command ship and your fellow crew members shouting at you through the comms system, the confusion of a seat-of-the-pants battle is recreated perfectly in every sense.

There's a huge range of new weapons for you to choose from: often you will be found defending yourself from enemy fighters while the latest missile slowly acquires a lock on your foe's vast ships. One technique you'll need to learn fast is destroying bombs – if you're involved in escorting a cruiser to a jump node, it's more important to take out the bombs that the fighters launch than the fighter itself, and luckily exactly the right kind of rapid

fire energy weapons have been developed for this very reason.

All of this adds up to a fantastic gaming experience. Freespace 2 is simply brilliant: the ultimate development of the space simulation genre. Buy it today and you won't be disappointed.

JASON JENKINS

PCW DETAILS



Price £34.99 inc VAT

Contact Virgin Interactive
0171 551 0000

www.freespace2.com

System requirements Pentium 200 (Pentium 300 recommended), 32MB RAM (64MB recommended), 3D graphics card, Windows 95/98



Rally Championship

You have to take the **rough with the smooth** if you're going to make it to this finishing line.

The market is full of driving games. Unfortunately, one thing that most of them have in common is that they are nothing like driving a car in real life. Developer Magnetic Fields has taken a different approach with Rally Championship and spent two years constructing a game that comes as near as you can get to being in a real car without, well, being in a real car. There are certainly a lot of tracks to get through. Magnetic Fields has managed to grab an exclusive licence to the full Mobil 1 British Rally Championship, and there's also an A8 championship. If the prospect of picking your way through lots of different stages doesn't appeal, then you'll like the arcade mode, where you race against the clock and the computer-controlled cars to finish first.

The work that has gone into this game to make it so realistic is truly staggering. Each of the various stages is a real track somewhere in the UK and has been meticulously recreated using filmed footage and photographs of the course and cross-referenced with up-to-date Ordnance Survey information.

There are 36 stages to work your way through, taken from the six rallies of the Mobil 1 series, and you can drive around them in one of 20 different cars. These have all been recreated from pictures and specifications provided by the manufacturers and look extremely realistic.

Gameplay is good fun, but is pretty difficult if you don't perfect your technique early on. Luckily there is a single race option so you can get some practice in. One of the most important manoeuvres you're going to have to learn is sliding round corners – applying the brake and accelerating at exactly the right time will whizz you round some bends

without slamming into the nearest tree. It becomes apparent very early on that you can't treat your car with the disrespect you can in the more arcade-focused racer games. It's all too easy to flip your car over if you happen to stray off the track. If you hit an obstacle you will incur damage, which increases until finally you can't drive at all. At the end of each race, your car isn't magically restored to pristine condition. You are given 30 minutes to repair the various parts you've damaged during the race.

Each part takes a

you can kiss goodbye any chance you had of winning the championship. This places a premium on careful driving – if you've gone flat out throughout the race and taken some nasty knocks then you'll have to slow down towards the end of the race so you can make it through to

the next one – better to sacrifice a few positions than lose any chance of completing the rally.

The graphics are excellent, and the best aspect is that you don't need the fastest PC ever built to play it – a Pentium II 300

will run it quite happily and you can even get away with a slower machine at a push.

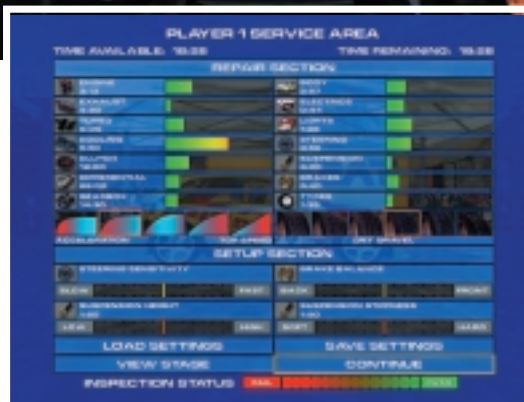
For those with more powerful systems, however, there are some fantastic graphical touches to enjoy – such as rain – that gives the whole thing an even more realistic edge.

On some levels, you'll even find yourself driving at night: it really gets the blood pumping when you're driving down narrow country lanes at a considerable speed and you

can't see further than the few metres lit up by your headlights.

Rally Championship combines adrenaline-pumping action with heart-stopping realism. A must-buy for any rally fan.

JASON JENKINS



certain amount of time to repair, so planning is essential. You have to decide what is most important: a new set of tyres or a perfectly working engine? Your car then has to pass an inspection. If it fails, you can't take part in the race and

PCW DETAILS



Price £34.99 inc VAT

Contact Electronic Arts 01753 549442
www.rally99.com

System requirements Pentium 200 (Pentium II 300 recommended), 64MB RAM, 8MB Direct X-compatible graphics card, Direct X 6-compatible sound card, Windows 95/98



FIFA 2000

Fancy tackling Best and Beckham? Well now you can and you **don't have to worry about cost.**

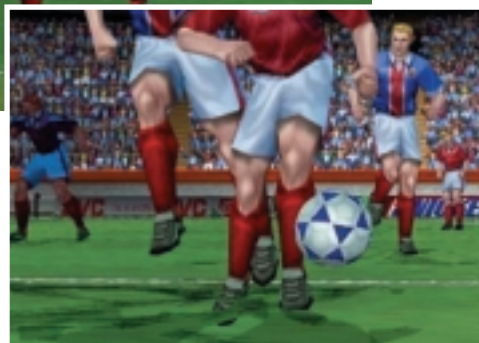
The latest in a series that seems to churn out a new edition with more regularity than a Dennis Wise red card, FIFA 2000 has a lot to live up to. The previous game was the fastest, most realistic, most playable football game so far. And yet, from the opening sequence to the final whistle, the millennium edition supersedes it in every way.

Typically for an Electronic Arts title, the opening sequence is stunning and will whet your appetite for the action to come. To the strains of a new Robbie Williams number written especially for the game, the familiar overgrown polygons mutate into beautifully animated, well-rounded figures. You'll soon see this approach has been transferred to the game itself with stunning effect. For a start, the stadia are superbly detailed and the players look like their real-life counterparts – from David Beckham's

coiffured locks to Gazza's bulk. The real difference, though, is in the way the players move.

More frames of animation have been added so that it's much easier to get a feel for exactly what your player is doing. Whether you're sprinting down the wing chasing a hopeful through-ball or attempting a last-ditch tackle in the penalty area, you'll soon be caught up in the atmosphere thanks to the responsive control system and realistic impression of speed and inertia.

Aficionados of previous games in the series will find the control system hasn't changed much, bar a few important additions. When you have the ball a small arrow now appears at the feet of players and flashes red, amber or green depending upon the likelihood of the pass reaching its target. This makes it much easier to set up penetrating attacks, while also improving the tactical aspect of the game. Rather than simply hoofing the ball up the field à la Wimbledon, you'll soon be stringing passes together in a manner that is



more suited to the beaches of Brazil.

Another innovation is the way that, upon taking a free kick or corner, each player is allocated a letter relating to a button on your control pad. Again, this allows you to pick out players with far more accuracy than the old extending arrow system.

A few new tricks and turns have also been added, including the ability to shield the ball Mark Hughes-style, but thankfully none of these intricacies take away from the simple pick up and play nature of the control system.

You are also spoilt for choice when it comes to options. You can either engage in a full season or simply play a friendly fixture against the club of your choice. As well as just about every major club side in Europe, you can choose from a selection of sides from around the world or even classic sides from the past.

This means that you can pitch the likes of Johan Cruyff and Georgie Best into the fast-paced modern game to discover whether players really were more skilful in the days of cloth caps, meat pies and Bovril.

The option to carry your team forward through a number of seasons makes FIFA 2000 far more engrossing than previous versions and will have you coming back time and time again in order to try and improve your league position.

It's a shame, however, that EA hasn't improved on the transfer system – it is still possible to fill your side with the best players in the world with absolutely no need to worry about how much they cost.

Our only other gripe is the fact that the in-game commentary is still far

from realistic, with John Motson remaining liable to come out with the same phrases time and time again.

It is, however, a great looking, eminently

playable footie simulation – the best yet, in fact. If you're equipped with a relatively fast PC and 3D graphics card and are even remotely interested in the beautiful game, then you definitely won't be disappointed.

OWEN GIBSON

PCW DETAILS



Price £34.99 inc VAT

Contact Electronic Arts 01753 549442

www.easports.com

System requirements Pentium 166 (266 recommended), 32MB RAM, Direct X 6-compatible graphics card, Direct X 6-compatible sound card, 50MB hard disk space, Windows 95/98



Age of Empires II

You've done Wallace, now **it's the turn of Genghis**. All in a day's work – just watch the blue lines.

Age of Empires is back with its very own sequel, Age of Empires II: The Age of Kings. Once again it's time to pretend you're a historical general, control a primitive civilisation through the ages, and take victory over oppressing forces.

Like its predecessor the game has a variety of campaigns in which to harden your battle skills, with the difficulty increasing as you go along. Campaigns are quite diverse, starting with William Wallace, but swiftly moving to Joan of Arc, the Crusades, and Genghis Khan.

Where Age of Empires II really sticks out above other real-time strategy games is in its depth. You have complete control over the economy of your village. Collecting gold, food, wood, and stone is essential in order to build troops, buildings and, more importantly, to progress from one age to the next.

Progressing through the game is a matter of researching new technologies so you can move, for example, from the Dark Age to the Castle Age. Each new age comes with its own improvements in the kind of troops and buildings that you can build.

Control of the whole operation is where things really take off. The game system neatly divides the local populace into two categories: villagers, and the military.

Villagers are the people who collect the resources, build the buildings and perform the repairs. And because they're people you can send them anywhere on the map to put up a building. The usual real-time method where you can only place a new building a certain distance from existing ones has thankfully been put to rest. This is especially useful when you want to put up an advance watch

tower. To succeed, you need to keep track of your villagers, and this is achieved through the most useful button in the game – the 'idle villager' button. Click on this and control is



immediately shifted to the first villager standing around doing nothing.

While villagers are undoubtedly an essential part of winning the war effort, you're not going to get very far without an attacking force. This brings us neatly to the military, whose job, simply put, is to hit things for you. We found the choice of troops to be very good, ranging from standard foot soldiers, to archers, to large-scale siege weapons.

Control of the forces is much as you'd expect. You can make them move anywhere on the map, or attack enemy units. The real trick comes down to the additional controls. First we have the action buttons, that describe how troops will react. For example the 'hold ground'



option stops troops moving from where they are standing. The default option is to run after any enemy they can see. We learnt this the hard way after all our defending troops decided to go on a group excursion to hunt down a single enemy villager. The temptation of an unguarded village

was too much for the enemy and they decided that now was a good time to waltz in and start the wholesale massacre of our villagers. Needless to say we didn't make this mistake a second time. Other controls let you group units together using a hot key, so in the middle of battle you can select groups and make them perform a task. Trust us, you're going to want to use this feature a lot.

We do have to mention a small problem we ran into on the troop front, and that was losing units behind buildings. What's supposed to happen is any troop blocked from view is given a blue outline which shines through any object. However, at points even this blue outline becomes difficult to see.

At the end of the day it's an enjoyable game, and there's a lot of attention to detail. You only need to see troops marching in formation, or your villagers cutting down trees and carrying away logs to understand. It's not much of a change from the previous game, but it's still definitely worth a look.

DAVID LUDLOW

PCW DETAILS



Price £39.99 inc VAT

Contact Microsoft 0345 002000

www.ensemblestudios.com

System requirements Pentium 166, 32MB RAM, 2MB graphics card, 300MB hard disk space

NeoGeo Pocket Color

It's an all-singing, all-dancing **mobile games console** that's big enough to take on Gameboy.

It may be unusual to see hardware in the games section of *PCW*, but this latest handheld games machine from SNK demanded an exception be made.

For years now there has only been one mobile entertainment system, the Nintendo Gameboy. This saw off early competition from Atari and Sega in the forms of the Lynx and Game Gear respectively. It's amazing that the Gameboy is still going after all these years, but that's what happens when a product has no natural predators. This situation has most definitely changed, though. Not too long after Nintendo breathed a new lease of life into the Gameboy by giving it a colour screen, the NeoGeo Pocket Color has hit the streets.

SNK might not be a big name in the gaming industry in the UK, but it's been making impressive arcade machines for some time. It also saw some success with the original NeoGeo games console released only in Japan, even though the games were exorbitantly expensive.

This time, however, SNK has come up trumps with an awesome new product that's priced aggressively enough to leave the Gameboy shaking in its shoes.

The NeoGeo looks similar to the Sega Game Gear with a landscape design and controls either side of the screen. Instead of a directional pad, the NeoGeo has a tiny microswitched joystick that makes controlling games a dream. Even the complicated moves involved in games like *King Of Fighters* are easy to pull off.

On the other side of the screen are two fire buttons and an option/pause button. The unit fits in the hands perfectly with all the controls falling naturally under the relevant fingers. The 2.6in screen is fantastic with a 160 x 152 resolution and a colour palette of 4,096 colours, although only 146 can be

displayed at once. There's no backlight so you'll need well-lit conditions to play, but this is a small price to pay for decent battery life. The Lynx and Game Gear were both backlit and the battery life was appalling.

At the rear is the battery compartment, filled with two AA cells. There's also a slot for a lithium backup battery. The latter

will look for, while *Metal Slug* is a first-rate scrolling platform/shoot-'em-up title.

As with all mobile games consoles, the NeoGeo can be linked to another unit for multi-player action, but it has another trick up its sleeve. The hottest games



may seem unnecessary, but there's more to the NeoGeo than games. It also has a built-in calendar and a world clock complete with an alarm function. You can even enter your birth date and your little friend will give you a horoscope for the day.

Of course, no games machine is worth its salt without some decent software to play on it. Thankfully SNK has come out with a storming line-up of launch titles. Nostalgic arcade machine junkies like myself will consider the NeoGeo an essential purchase just for the chance to play *Puzzle Bobble* on the move. Fans of the dinosaur twins *Bub and Bob* will flip over this perfect conversion of the arcade puzzle classic.

It's not all retro titles, though. The aforementioned *King Of Fighters* is a great fighting game with all the secret moves that fans of the genre

machine at the moment is Sega's new Dreamcast, and the NeoGeo is great friends with Sega's new baby. Another link-up cable will be available to connect the NeoGeo to the Dreamcast, with games like *King Of Fighters* already having a Dreamcast link feature. With this link you'll be able to swap characters and stats between NeoGeo and Dreamcast games. Whether this feature will take off remains to be seen, but it's definitely another string to the NeoGeo's bow.

However, the best thing about the NeoGeo is its price. At only £59.99 not only is it a fantastic machine it's also fantastic value.

RIYAD EMERAN

PCW DETAILS



Price £59.99 (Games £24.99 each)

Contact SNK 0181 371 9911

www.neogepocket.co.uk



Hidden cells

You'll need to get out your spreadsheets for this one. Or maybe not. Take a look at the five sets of 25 cells, shown below. Each cell represents a reference relative to a separate cell within a separate set of five sets of 25 cells (hidden from view, of course, somewhere within an imaginary spreadsheet — this might be a good time to get yours out). Each cell contains an identical (simple) formula... once you've found that formula, it should be easy to work out exactly what belongs in the hidden set of cells. The hidden set reveals a rather well known company in the world of IT.

Find the solution and you could have a chance to win a mystery software prize. Send the solution, your name, and an address where the prize can be sent on a

5	4	5	5	5
5	5	4	4	6
5	5	5	5	5
5	5	6	6	4
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6	7	5	3	4
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6	4	4	6	5
5	6	5	4	5
4	5	7	5	4
5	4	5	6	5
5	6	4	4	6

blob and move on two points in a

postcard to: PCW Prize Puzzle (February 2000), VNU House, 32-34 Broadwick Street, London W1A 2HG or by email to: letters@pcw.co.uk. Answers should arrive no later than 20 February 2000. Please note that we DO NOT open attachments, but you shouldn't have to use any graphics for this one.

Quickie

Draw a five-pointed star on a piece of paper. Starting from any of the 10 points of intersection (interior or outside points), move on two points in a straight line, and draw a blob. Now find another point of intersection without a blob and do the same again, drawing a new blob at your destination. Remember that you must start on a point WITHOUT a

straight line. Fill up all the intersections, bar one, with blobs in this way (it's not as easy as you might think).

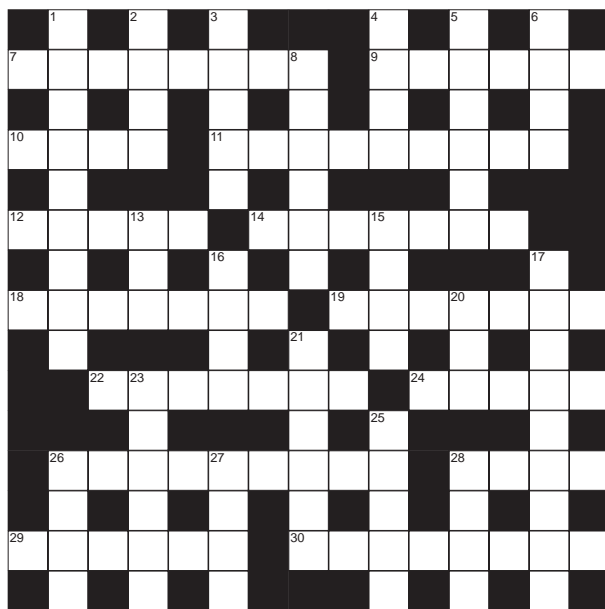
Winner of November's Prize Puzzle

The November puzzle invoked a fair response and the problem was to find three sums of money which gave the same result if they were added together as if they were multiplied together.

There is more than one solution to this problem as stated above, but we added further conditions that each sum was more than £1, but less than £10, and that the total number of pence spent ended in seven. There is only one solution that satisfies all these conditions: £1.25, £1.62, £2.80.

Most entrants managed to supply this answer. So we called in our random number generator to settle the dispute and it chose the entry from Mr Alan Whiteley of Egham, Surrey. Congrats Mr Whiteley, your prize is on its way to you.

prize crossword



ACROSS

- 7 Symbolic smiley, perhaps (8)
 9 Key part of a URL (6)
 10 Second, possibly buggy, version (4)
 11 Money-making on the Internet (9)
 12 Standard character scheme (5)
 14 Internet virgins? (7)

- 18 Parcels of personal details (7)
 19 The V of VR (7)
 22 Amount of activity taking place (7)
 24 Surfer's phone-line device (5)
 26 Item for audio capability (5, 4)
 28 Click, hold and move (4)

- 29 Entry into a system (6)
 30 The M of IBM (8)

DOWN

- 1 Type of water heater (9)
 2 Ancient portico (4)
 3 Performed (5)
 4 Man of Eden (4)
 5 Gradually appear (6)
 6 Rodents (4)
 8 Loops of rope (6)
 13 Writing fluid (3)
 15 Hat's edge (4)
 16 Red meat (4)
 17 Slashed (9)
 20 Duo (3)
 21 Remove guns from (6)
 23 Woke (6)
 25 Decree (5)
 26 Dismiss (4)
 27 Run (4)
 28 Wimpy person (4)



Each month, one lucky PCW Crossword entrant wins a copy of the new *Chambers Dictionary*. The winner of December's puzzle is: **Brian Leeming of Huntingdon, Cambridgeshire**. This time, it could be you. Send your completed crossword to: 'PCW February - Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 20 January 2000.
 • Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Solutions to January's crossword

ACROSS

7 Decryption 8 TIFF 9 Cassette 10 Screen 11 Tester 13 Integer 15 Prompts

DOWN

1 Decanter 2 Crisis 3 Spot 4 Tiger 5 Ants 6 Effete 8 Darkest 12 Enter
 14 Niece 16 Mutter 18 Atlantic 20 Opaque 22 Indoor 23 Crazy 25 Sift 27 Says

Win VideoLogic DigiTheatre 5.1

To really appreciate the outstanding quality of DVD movies, you need Dolby Digital surround sound. However, most Dolby Digital decoders are expensive, even if we don't factor in the cost of the required amplifier, speakers and subwoofer. An absolute bargain at £249.99 is VideoLogic's DigiTheatre 5.1 Dolby Digital decoder and speaker system. This setup provides high-quality, cinema-style sound, either with a standalone DVD player or a PC with DVD-ROM.

DigiTheatre has been extremely well received, winning several awards already – in fact we gave this product five stars in last month's issue.

DigiTheatre provides full Dolby Digital decoding and output from a complete system that includes six speakers (two rear, two front, one centre, one subwoofer), six integrated amplifiers and a separate Dolby Digital decoder box.

DigiTheatre also provides MPEG2 surround, stereo and full legacy support for Dolby Pro Logic.

It's styled in charcoal and black for a living room setting and also looks great next to a PC.

We have four of these fantastic systems to give away!

Four runners-up will receive VideoLogic's SonicVortex2, a high-performance and advanced audio add-in card for gamers, worth £64.99. SonicVortex2's 3D positional audio, using the acclaimed Aureal A3D 2.0 standard, brings game environments to life. Now the level of acoustic realism



THE VIDEOLOGIC DIGITHEATRE 5.1 PROVIDES HIGH-QUALITY, CINEMA-STYLE SOUND AND IS AN ABSOLUTE BARGAIN AT £249.99

matches the immersive 3D worlds of the latest, greatest games.

With support for the most recent Aureal 2.0 API, SonicVortex2 delivers the ultimate in features and performance for gaming, as well as stunning 3D positional audio – all with low CPU usage to keep game-play fast. And the SonicVortex2 is not just for gamers. It also excels at music, providing a 320-voice wavetable synthesiser (64 voices in hardware), a superb 4MB sample set and an optical digital output at up to 48KHz.

Software bundled with the card includes Future Beat 3D, Making Waves, Yamaha XG Studio, Yamaha XG Soft

Synthesiser, Dance EJay2 and Jet-Audio.

For more information on the DigiTheatre or any other VideoLogic product phone 01923 260 511 or visit the company's website at: www.videologic.com.

■ To enter this competition, simply answer the following questions:

- 1) How many speakers does VideoLogic's DigiTheatre include?
- 2) What does DVD stand for?
 - a) Digi Video Disc
 - b) Digital Video Data
 - c) Digital Versatile Disc

How to enter the competition

Write your name, address and daytime telephone number on a postcard or the back of a sealed envelope. Mark your card 'PCW/VideoLogic Competition' and send to the following address by 31 January 2000:

Personal Computer World
Building 960
Sittingbourne Research Centre
Sittingbourne
Kent ME9 8AG

◆ Competitions are open to residents of the UK only.

Rules of entry

This competition is open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and VideoLogic. The Editor of *Personal Computer World* is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

J Mark Lytle takes a gander at **Micro Astrology**, and charts the love story with Dell's first laptop.

20 YEARS AGO February 1980



Turning the clock back exactly two decades to February 1980, the cover bore an unusual Catherine Denvir illustration headlining a feature on 'Micro Astrology'. Readers

found Roger Elliot's piece on computerised horoscopes – complete with flowcharts – quite a talking point. Roger's business was putting computers and planets together to come up with personalised horoscopes. His equipment consisted of a Cromenco System Three PC with 64KB of RAM and a 1MB hard disk. He was offering individual star charts for £4.80 or software to produce your own, on a variety of PET, Apple and Tandy machines, from £15.

Page 78 brought us the glorious vision in tight-set type that was an expose by Alan Mills and KT Kibase of the IEEE 488 bus. At a time when FireWire was but a pipe dream, Messrs Mills and Kibase dealt at length with the complexities of interfacing microprocessors with the outside world, concluding that 'IEEE 488 is a boon to the black art of interfacing'.

February's benchtests covered the Heath WH-89 – a 50lb all-in-one PC – and the ACT System 800, an impressive beast with 48KB of RAM. The Heath was slated by Mike Dennis for sticking to an old-time assembler, based on Octal routines, while the ACT made plenty of friends in spite of its £4,000 price tag.

15 YEARS AGO February 1985



The era of Madonna's *Like a Virgin* saw a PCW that had bulked up considerably, changing the cover tagline from: 'Europe's Leading Micro Magazine' to 'Britain's Biggest

Microcomputer Magazine'. The cover story, by Peter Bright, told us everything about GEM – the operating system that brought Apple-like features to Acorn, Apricot, Atari and IBM screens. As Peter said: 'Windows is still in the pipeline... so, from the user's point of view, GEM is the best thing this side of a Mac.'

Products on test included the

Penman, a 'graphics turtle-cum-plotter' – Simon Craven found potential uses from illustrating spreadsheet models to educational graphics, whatever those might be. Other benchtests covered WordStar 2000 – possibly the first millennium-branded product – and Sharp's MZ-800 home computer.

WordStar 2000 was an update of its complex forerunners and proved a hit with reviewer Kathy Lang, which was surprising, as it wasn't much better. For £440 users got simple windowing, a calculator, mail merge and a spell checker. The Sharp machine, based on a 3.5MHz Z80A processor, seemed to fall between the twin stools of home and office use and was criticised by Tony Hetherington for its 'large footprint and ungainly appearance'. Finally, the best ad award has to go to Sinclair for its QL fliers, offering such delights as a 'Firefly QL Winchester disk with a full 7.5MB of storage' for £1,149, surely enough to buy a small car in those days?

10 YEARS AGO February 1990



A new decade brought us a new breed of Intel-based computers, notably our cover star – Dell's first laptop, the 316LT – based on a speedy 16MHz 386SX processor. The quirky

design and tiny screen didn't prevent Guy Swarbrick from falling in love with it, proclaiming: 'For those enamoured of Dell's excellent customer support service, the 316LT may be ideal.'

In the month that saw the release of Nelson Mandela, Nick Beard wrote about the Gibson-esque topic of neural networks and how computers were being taught to think. He underlined the advantages of neural computing, specifically that neural nets can 'learn by example' and are 'fault tolerant'. Now, let's see about getting the latest version installed on the ed's PC.

Under the covers of 'The Technology Journal of the Year', our reviews touched upon hardware as diverse as the Tulip tr486, which made use of 'the power of the 486 chip' and graphics cards tested by Mick Andon, including the Marksman 1600 at over £4,000. Mick concluded that while: 'price is an important factor... any perceptible difference in image

definition is more likely to result from the quality of the screen than the graphics controller.'

Features delved into the mysteries of music on the Atari ST (about which we still receive letters) and the classic British machine, the Acorn Archimedes. We ran workshops aimed at 'Demystifying Unix' and pondered the question: 'SQL on mainframes and minis – but PCs too?'

5 YEARS AGO February 1995



A mere five years ago and, unsurprisingly, we find ourselves in more familiar territory, particularly with the cover feature on MPEG cards. The group test by Tim Frost on

'bringing movies to your monitor' introduced the concept of compressed video and concluded that, in spite of exciting prospects, it was 'early days yet to take MPEG cards as a serious and reliable route to video on the PC.'

Also noteworthy was the similarity between companies advertising in our hallowed pages then and now. The 'biggies' were out in force, including Software Warehouse, Time and Tiny.

Our splendid spread of group tests saw the lucky Gordon Laing inspect 27 monitors, while Tim Nott tapped on 15 word processing packages. Gongs in each round-up went to the Taxan Ergovision 2100LR and WordStar 2 respectively. Taxan continues to impress today, winning Editor's Choice in our group test last November, while WordStar has weathered the office suite storm and is still used today.

Not to be overlooked was the summary of the range of rivals to Visual Basic and our disapproval of Timex's bizarre Data Link watch, which never caught on. All this and more in a month when OJ Simpson went on trial in California and the Labour Party held an unprecedented 36-point lead in the opinion polls.

Finally, the disk clinging limpet-like to the cover included an 'intelligent wallpaper calendar' and 'Dave's Targa Animator'. Quite what has happened to Dave, we're not sure, but his animator is still around and doing a wonderful job.

Sinclair ZX81

A top PC for only £69.95, that'll be the Eighties.

True genius can usually be spotted early on, but commercial success tends to come later. Something along these lines happened with Sir Clive Sinclair back in the early Eighties, then sans-knighthood. It's fair to say that Sinclair kicked off British home computing with the ZX80, a machine that remarkably gave you five pence change from £100 – saving a further £20 if you were willing to assemble it yourself. It wasn't the world's most impressive computer in specification or looks, but at that price you couldn't argue, and in 1980 thousands didn't.

The ZX80 was inspired by the earlier success of Sinclair's MK-14 computer, little more than a bare circuit board marketed under the company name 'Science of Cambridge'. However, it was the success of the MK-14 and ZX80, along with lessons learnt from their development, that allowed Sir Clive to come up with his first big computing hit: the ZX81 – which reportedly sold over one million units worldwide.

The Sinclair ZX81 owed more than its wedge-shaped looks and naff membrane keyboard to its predecessor. It was based on the same basic hardware, with a 3.25MHz Z80A processor and 1KB of RAM, but there were several key improvements. ZX80 owners may look back fondly, but they're probably forgetting the fact that the CPU controlled the display, blanking the screen out momentarily if it had to think about anything else – like a key press. When typing, the screen would flicker in and out, which was very distracting.

Perhaps surprisingly the ZX80 also had no floating-point math facility, and what OS there was felt severely cramped in the 4KB of ROM.

Sinclair wanted the ZX81 to fix all of those problems and, better still, cost less. Nine Tiles, which wrote the original BASIC for the ZX80 (and unenviably trim it from their originally submitted 5KB to 4KB), were again asked to supply the OS. Now with an impressive 8KB of ROM to play with, Nine Tiles extended the ZX81's BASIC, wrote a fully-featured floating-

THE ZX81, FOR THE TIME, WAS SURPRISINGLY NON-CRASH-PRONE... UNTIL YOU ADDED THE RAMPAK!

point package and improved the input/output side of things.

To save money, Sinclair had to reduce the component count, and recruited Ferranti to integrate most of the logic and display circuitry onto a single Uncommitted Logic Array (ULA). This chip handled the TV output, leaving the processor to more important things – eliminating the ZX80's flickering display. In the end, Sinclair managed to reduce the ZX80's 21 chips to just four on the ZX81: the Z80A CPU, 1KB RAM, 8KB ROM and the ULA. By building a computer around these chips, Sinclair could sell it for only £69.95 ready built, or a mere £49.95 in kit form. Timex built the machine, and it was marketed under this brand in the US.

The ZX81 ran from a 9v external power supply, and drove TV sets with its black and white 32 x 24-character UHF output. It also spawned the first peripherals, with the infamous 16KB RAMPAK and ZX Printer. The RAMPAK crashed every half-an-hour or so, or just as soon as you'd finished typing in the mammoth listing from early PCW pages. The ZX Printer produced hard copy, but

on horrible thermal paper, which tended to fade at any hint of sunlight. The ZX81 FAQ fondly describes the ZX Printer and metallic paper as looking like 'a rather evil sort of toilet roll'.

I, however, warmly remember my ZX81 days, of first learning to program BASIC and fearing the genuinely scary Tyrannosaur in 3D Monster Maze. Plenty of others also still love it. Paul Robson has written one of the most popular emulators, <http://users.aol.com/autismuk/sinclair.htm> and Grant Searle



will even show you how to build one. See www.home-micros.freemove.co.uk/zx80/zx80.html. The ZX Spectrum came out just a year later, but those were the most influential 365 days in kids' lives.

GORDON LAING

**PERSONAL
COMPUTER
WORLD**



Are you mad about IT?

Do you want to get your hands on all the latest technology before anyone else?

If the answer to either question is yes, PCW is interested in hearing from you. We're looking for a Labs Tester to help evaluate the equipment reviewed within the pages of *Personal Computer World*. You'll need a thorough technical knowledge of all things PC-related. You'll be able to build a PC from the ground up and dismantle it just as easily. You should be aware of all current and emerging technology and trends. You'll also need to be methodical and disciplined, as well as pro-active in approach. If you think you fit the above description, send your CV and a covering letter to:

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VNU Business Publications
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London W1A 2HG
Or by email to gordon_thorn@vnu.co.uk
Closing date 11 February 2000